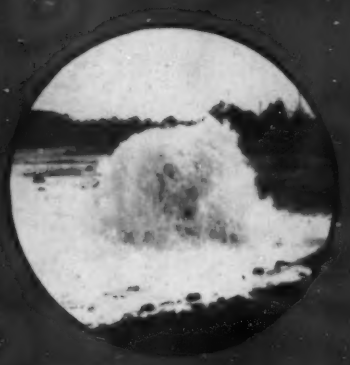
MINING WORLD



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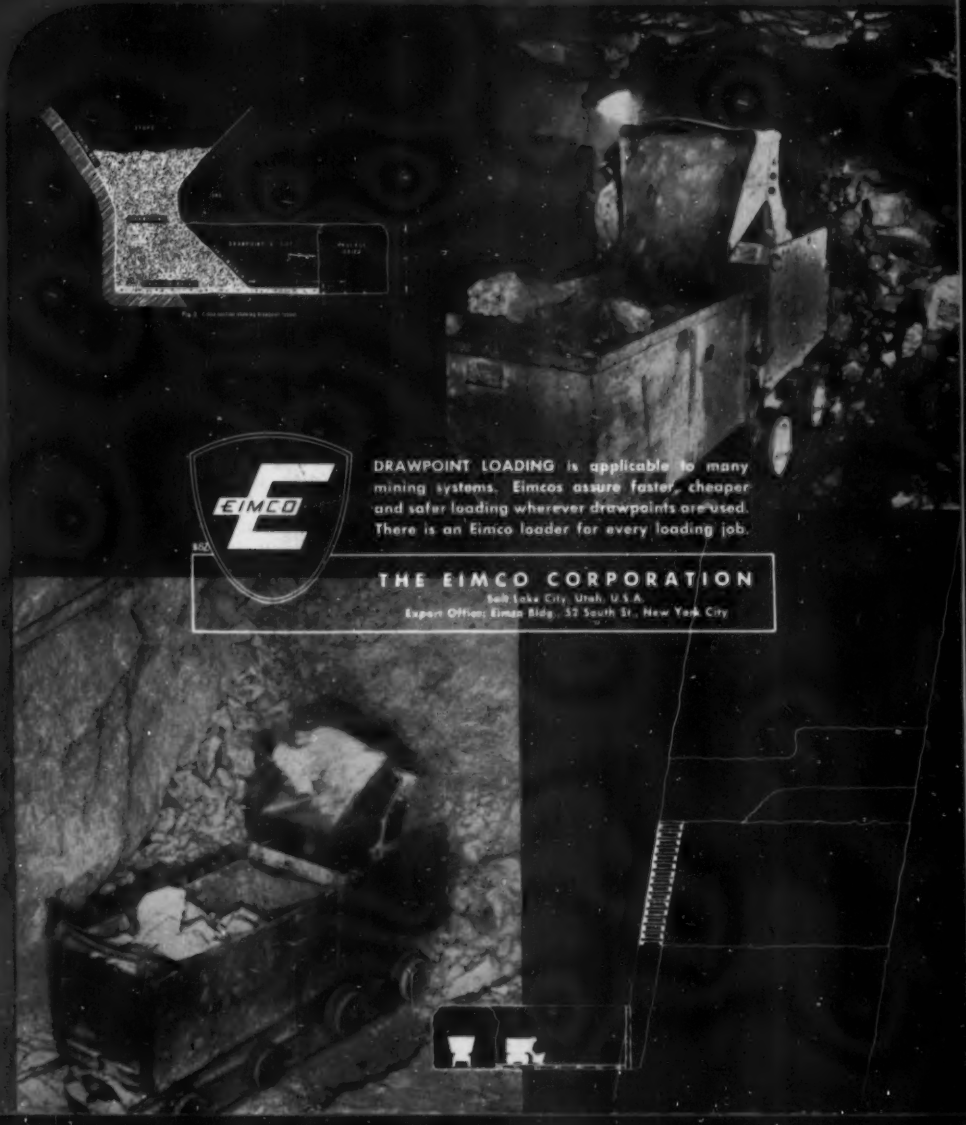
NOVEMBER 1954

VOL. 16 No. 12



DRAWPOINT LOADING is applicable to many mining systems. Eimcos assure faster, cheaper and safer loading wherever drawpoints are used. There is an Eimco loader for every loading job.

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Where 342 years of 'Keyman' experience guides every step of ore beneficiation

Portion of mineral dressing laboratory.

GEOLOGICAL DIVISION
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- Training of Plant Personnel

When you're tracking down the optimum flowsheet, there's no substitute for experience. That is why Galigher ore testing—guided by eleven men with aggregate service of 342 years—has acquired top ranking in the diversified fields of metallurgy.

Galigher engineers keep well abreast of the changing and advancing art of ore treatment, both in methods and equipment. Whether yours is a projected or an established plant, test work on representative samples acts as a guide to insure a profitable mill operation. Galigher metallurgical service can help you avoid the pitfalls of inaccurate data and faulty design.

The guidance of our competent engineers is yours for complete metallurgical service from ore testing to detailed plant design.

Inquiries by mail will be promptly answered.

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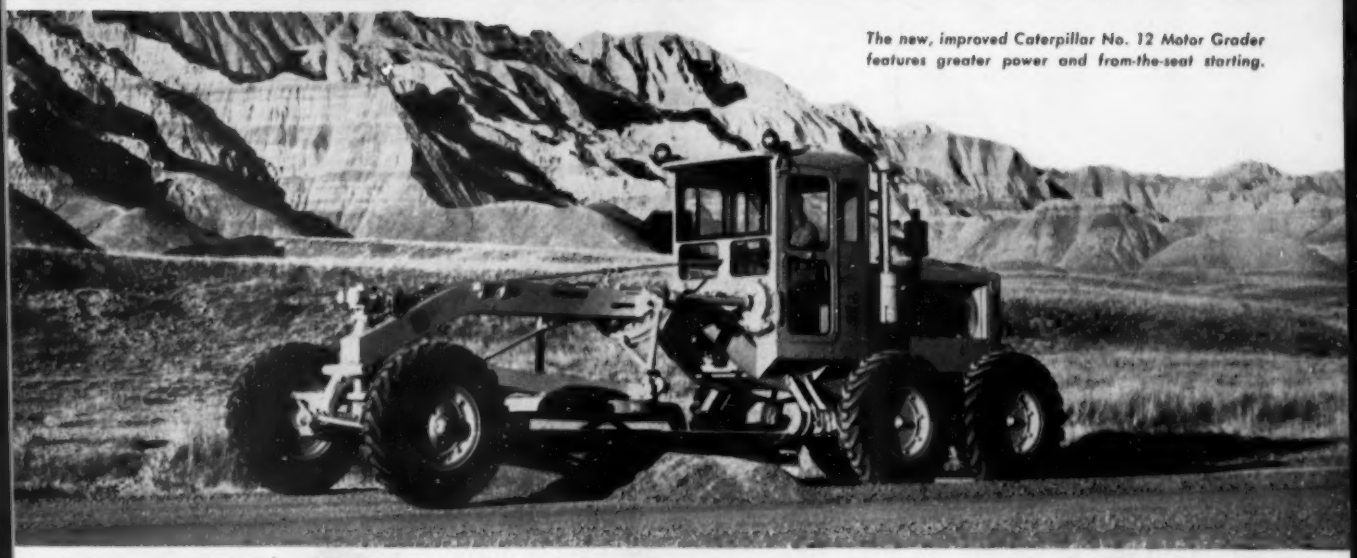
NEW

in the No. 12

115 HORSEPOWER

A 15% INCREASE IN POWER

NO INCREASE IN PRICE



The new, improved Caterpillar No. 12 Motor Grader features greater power and from-the-seat starting.

NEW

in BOTH No. 12 and No. 112

One-lever from-the-seat starting

Accelerator-decelerator pedals

Improved hand throttle

Redesigned instrument panel in easy-to-read location

No increase in price

Now there's a new high in performance in CAT* Diesel No. 12 and No. 112 Motor Graders. In keeping with Caterpillar's policy of constant product improvement, both these rugged machines incorporate new features that increase their profit-making capacity. The new No. 12 packs more power, 115 HP—and has faster reverse speeds—low reverse, 4 m.p.h.; high reverse, 6.3 m.p.h. For durability, the capacity of the transmission and clutch has been increased to match the greater horsepower. Other improvements, standard in both the No. 12 and No. 112, are: convenient one-lever from-the-seat starting and the accelerator-decelerator pedals that permit changing speeds without changing throttle setting.

With these and other new features, you can figure on even *more* work at lower cost from the No. 12 and No. 112. Along with the No. 212, they are the only motor graders whose major components are built entirely by one manufacturer and serviced by one organization. Their performance record is unmatched—more than 99% ever built are still in use. Ask your nearby Caterpillar Dealer to show you how these machines can step up production and profits for you!

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill., U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

SMALL QUARRIES AND MINES IMPROVE THEIR PROFIT PICTURE WITH "EUCS"

fewer drivers . . . lower fuel cost . . . reduced maintenance

When your competitors are using "Eucs" to haul stone, sand or gravel, you've really got a problem on your hands! You just can't afford to pass up the cost cutting advantages . . . the high production and low maintenance cost . . . that you get with "Eucs".

And your operation doesn't have to be a big tonnage producer for "Eucs" to pay off. For example, H & R Stone Co. of Indiana is just one of many small quarries, sand and gravel producers, and open pit mines that have cut their hauling costs with Model UD 10-ton Rear Dumps. This quarry replaced four conventional highway trucks with a single 10-ton "Euc" and reports savings of $6000 per year in maintenance cost alone. Because the "Euc" stays on the job with none of the lost time that was a costly headache previously, there have been important savings in labor cost, too.

Have your nearby Euclid Distributor provide a production and cost estimate for your operation . . . there's no obligation and the chances are mighty good that he can show the way to better profits through lower hauling costs.

10-ton off-highway "Euc"

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GENERAL MOTORS CORPORATION
Cleveland 17, Ohio
Cable Yuklid—Code Bentley

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FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

Mining World

Including the Export Edition **WORLD MINING**

Published monthly except in April when publication is semi-monthly

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COVER CIRCLE

Corrosive-gas laden-mine water being discharged, from pumps located in the No. 5 Tamarack shaft, at an average rate of 9,000 gallons per minute. Entrapped gases escape as the water is discharged, sending it into the air much like a geyser.

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GRAB SAMPLES From the Mail

Problems In Article Filing

Dear Sir:

Two years ago I wrote and suggested that you incorporate a Metal and Mineral Price list. While I do get other market and price lists, I find the form in which you report most helpful; it files well, and I have been able instantly to follow market fluctuations over the last two years.

My engineering files are also filling very rapidly owing to the excellent quality of your articles and the manner in which you keep us engineers up to the minute with any new developments.

However, I would like to offer a suggestion.

Can you not insert a page of advertisements between your articles? Please refer to the June 1954 issue of MINING WORLD page 55. This is the last page of the article describing Manganese, Inc's. manganese operations while page 56 (back of page 55) deals with rutile operations in Australia.

The last page of the manganese article must go in my manganese file which means that the first page of the rutile article is missing when it is filed under Rutile.

Thanks again for your excellent production.

A. R. BARBER
Mine Manager
Malvern
Johannesburg, Union of South Africa

Mr. Barber has a filing problem which other MINING WORLD readers have solved in various ways. Some file the complete issue and have a series of index cards on which they enter all articles pertaining to manganese with title, month published, and page numbers. Similar cards are used for other subjects they are interested in. Others save all issues and make a yearly card index by cutting up the annual index of key articles which always appears in the December issue. This index was especially designed for this type of filing with cross references from metal to company, to location, to title, and to author. Still a third system used by some individuals and more companies is to buy two copies of MINING WORLD so as to insure a complete set of articles when, as in this instance, parts of two separate articles are on reverse sides of the same sheet of paper.

Very frankly the editors work hard to keep this one section of the book free from ads, and even harder to make as many articles as possible start on the left page. This means there will be a continuance of articles back-to-back.

The editors would welcome reports on other methods of filing used by MINING WORLD readers.

Increase your footage

Use CLEVELAND Air Legs and Drills...the easiest way

THE FEED YOU NEED — FROM ZERO FEED TO FULL LINE

Eleven detent positions enable drill operator to set and maintain pressures in a range from zero to full-line feeding pressure — with an increase of 9 psi at each setting. That's why a CLEVELAND Air Leg and H10AL Drill combination gives top performance in any kind of rock.

Shown here is a **CLEVELAND AL-92** Telescopic Air Leg with H10AL Drill. Because of space limitations, full length isn't shown.

CLEVELAND AL-92 Telescopic Air Leg with H10AL Drill and exclusive 11-position feed control

SPECIFICATIONS

Standard, automatic controlled wet-type backhead.

Chuck Sizes	7/8" x 4 1/4" — or other popular steel shank sizes	
Weight, Drill	60 lbs.	
Air Hose	3/4"	
Water Hose	1/2"	
Full Feed Travel	4'	6'
Collapsed Feed	2' ea. piston	3' ea. piston
Closed Length	48"	60"
Extended Length	96"	132"
Air Leg Weight	37 lbs.	42 lbs.

CLEVELAND AL-90 Single Extension Air Leg for use with H10AL Drill and exclusive 11-position feed control

SPECIFICATIONS

Weight, Drill	60 lbs.
Air Hose	3/4"
Water Hose	1/2"
Feed Travel	36" — 48" — 60"
Closed Length	56 3/4" — 69" — 81 1/4"
Extended Length	92 3/4" — 117" — 141 1/4"
Air Leg Weight	30 lbs. — 34 lbs. — 37 lbs.

CLEVELAND AL-91 Single-Extension Air Leg for use with any 35-lb., 45-lb., or 55-lb. class rock drill. Feed control built into air leg.

SPECIFICATIONS

Standard wet, or automatic controlled, wet-type backhead available.

Air Hose	3/4"
Water Hose	1/2"
Feed Travel	36" — 48" — 60"
Closed Length	58" — 71" — 83"
Extended Length	94" — 119" — 143"
Air Leg Weight	35 lbs. — 38 lbs. — 41 lbs.

per man-shift!

to drill rock

Choose the drilling combination that's best for you from the industry's only complete line of telescopic or single-extension air legs.

MINERS like to use a CLEVELAND Air Leg and H10AL Drill combination. It gives them real flexibility — they can use it as a drifter . . . as a stoper . . . or as a hand-held drill . . . set-ups are quick and easy.

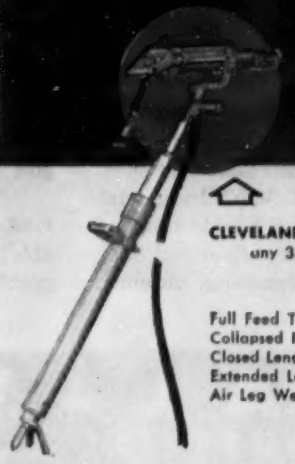
It's an easy-handling combination, also. The air leg supports the drill and absorbs fatiguing recoil. You get flexible feeding pressure, too — from zero to full line. That's why miners drill more footage with CLEVELAND, yet are less tired at the end of their shift.

Exclusive CLEVELAND built-in feed control in the H10AL Drill eliminates a third hose and cumbersome "Y" connections. There's no feed-control bleed valve — the operator doesn't have to bleed off air continuously, to maintain suitable feeding pressure. He can change or advance the position of the leg easily and quickly.

The air leg holds the drill in line with the hole — thus reducing front-end drill wear and practically eliminating rotation strains.

These are ways a CLEVELAND Air Leg and H10AL Drill combination helps you get more drilling for less cost. Take advantage of them.

Write today for Bulletin RD-30 for complete information.



CLEVELAND AL-93 Telescopic Air Leg for use with any 35-lb., 45-lb., or 55-lb. class rock drill. Feed control built into air leg.

SPECIFICATIONS

Full Feed Travel	4′	6′
Collapsed Feed	2′ ea. piston	3′ ea. piston
Closed Length	50″	62″
Extended Length	98″	134″
Air Leg Weight	42 lbs.	47 lbs.

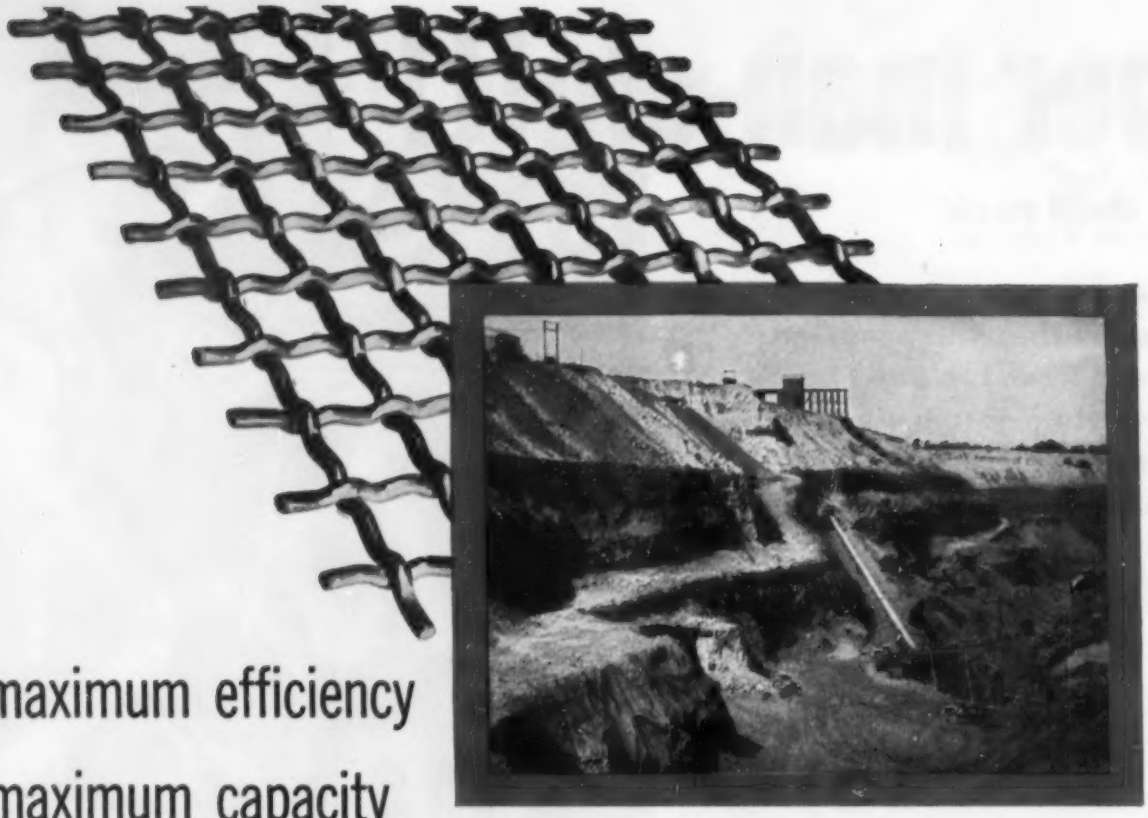
CLEVELAND ROCK DRILL DIVISION

Westinghouse Air Brake Co.

12500 BEREA ROAD • CLEVELAND 11, OHIO

RD-59

Plants: Milwaukee, Wisconsin • Cleveland — Greenwich — Dunkirk, Ohio • Coldwater, Michigan



maximum efficiency

maximum capacity

maximum life . . . all yours with

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You can always select the right screens with the correct mesh and metal for your job from CAL-WIC's extensive line of industrial screens. CAL-WIC Industrial Screens are fabricated in a wide range of types from the toughest carbon and alloy steels. Whether for processing, cleaning, grading, screening, for any type of equipment, CAL-WIC Industrial Screens will give the results you require.

CAL-WIC engineering assistance is available to help you solve your screening problems—write, today.

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THE COLORADO FUEL AND IRON CORPORATION

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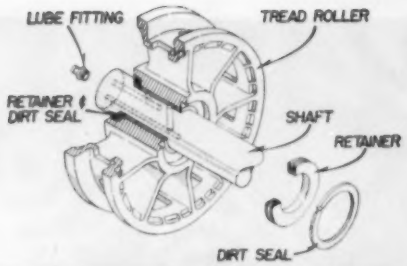
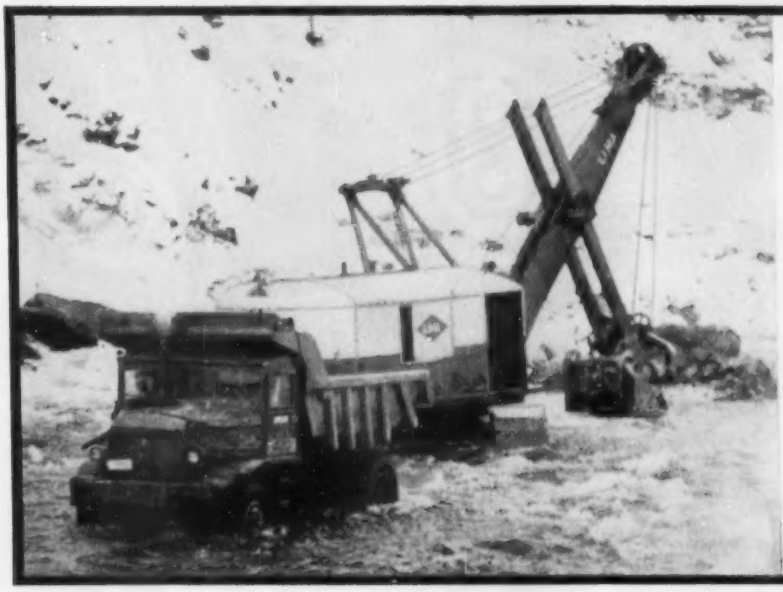


LIMA DIRT SEALS
CUT DOWN-TIME AND MAINTENANCE COSTS



This LIMA shovel, demonstrates the importance of LIMA'S dirt seals and grease retainers.

In such work, abrasive material which wears out the bushings and shafts of ordinary shovels is excluded. LIMA seals the lubricant in and dirt out, thereby reducing friction and prolonging the life of bushing, roller and shaft.

COMPARE! No other machine gives you as much as LIMA!

1. Bronze bushings in tread, idler and drive rollers are protected by piston-type dirt seal rings and retainers.
2. All gears, smaller parts and shafts which are subject to extra wear are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation to eliminate excess counterweight.
4. Anti-friction bearings, used at all important bearing points, reduce destructive friction, fuel consumption and lubrication requirements.
5. Big capacity drums and sheaves lengthen cable life by reducing the need for double wrapping and sharp bends in cable.
6. Full air controls on travel, hoist, swing and boom hoist, result in smoother, more precise operation, minimum maintenance and less operator fatigue.
7. Torque converter (optional) automatically adjusts speed to load requirements, minimizing shock loading, making performance smoother and faster.
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (¾ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable).

DISTRIBUTORS IN ALL PRINCIPAL CITIES OF THE WORLD

Cable Address: Limashovel, Lima, Ohio, U.S.A.

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Construction Equipment Division

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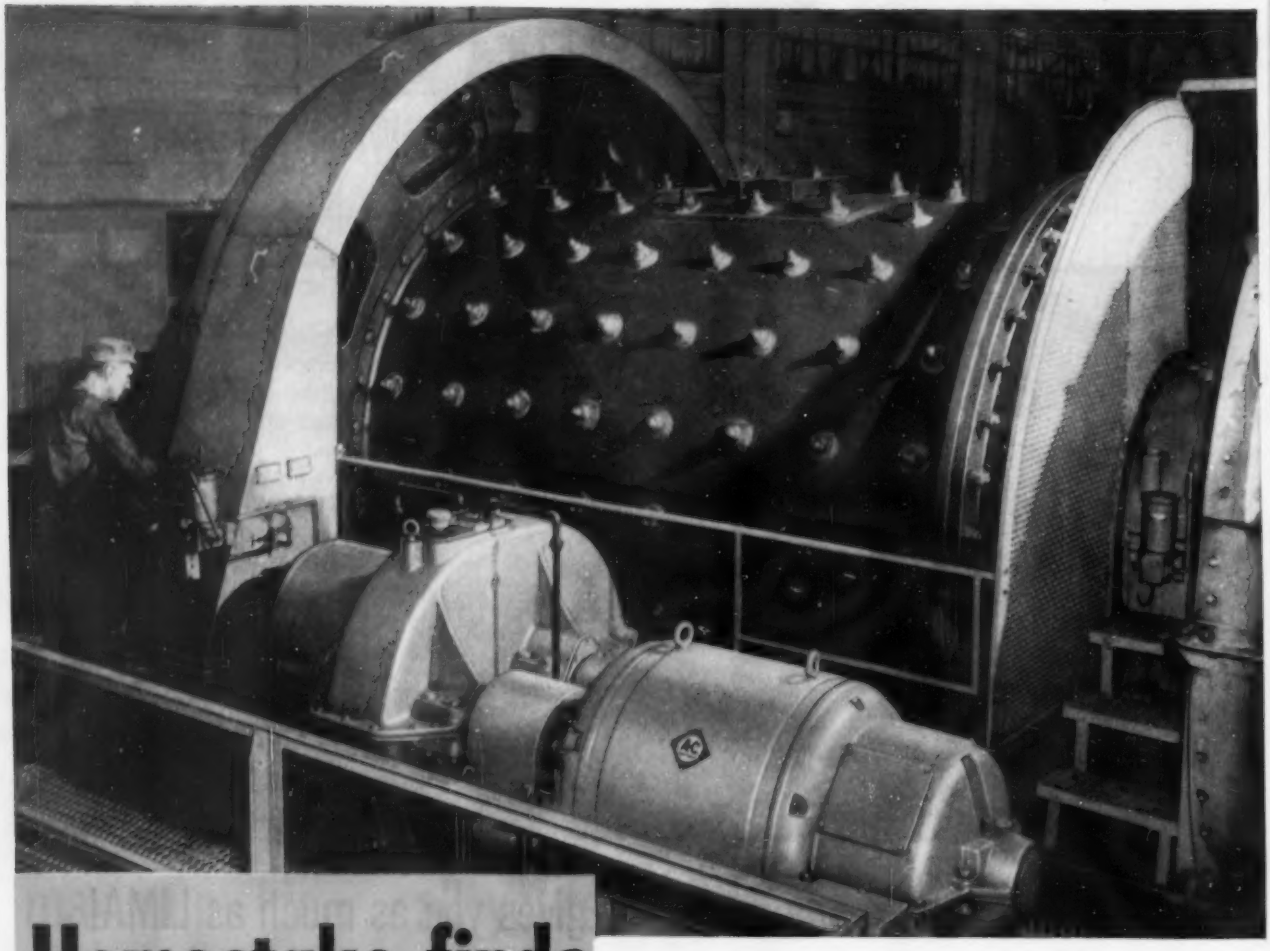


Homestake finds Gold in MODERNIZATION

Industry's Top Technical Team Helps Reduce Operating Costs

A 2.25 kwhr saving per ton in power consumption — a 37½% reduction in operating labor—a similar saving in maintenance and supply work — considerable space conservation. These benefits realized by Homestake Mining are gilt-edged proof that modernization pays.

Pressured by increasing labor and material costs, in the face of a fixed price on gold, Homestake took a long, hard look at its gold ore operation. With the *help of Allis-Chalmers*, the Homestake staff made a comprehensive study of all phases of ore treatment. Crushing and grinding flow sheets were drawn up and costs estimated. Machines were operated under varying conditions. Power measurements, product analyses and man-hour appraisals were made in a pilot plant run.

As a result of this thorough investigation, a modernization program was launched in each of Homestake's two crushing plants and mill. New equipment was installed and procedures modified to make existing equipment as efficient as possible. Two years of profitable operation have proved that Homestake Mining has struck a rich vein in modernization.

A-4470

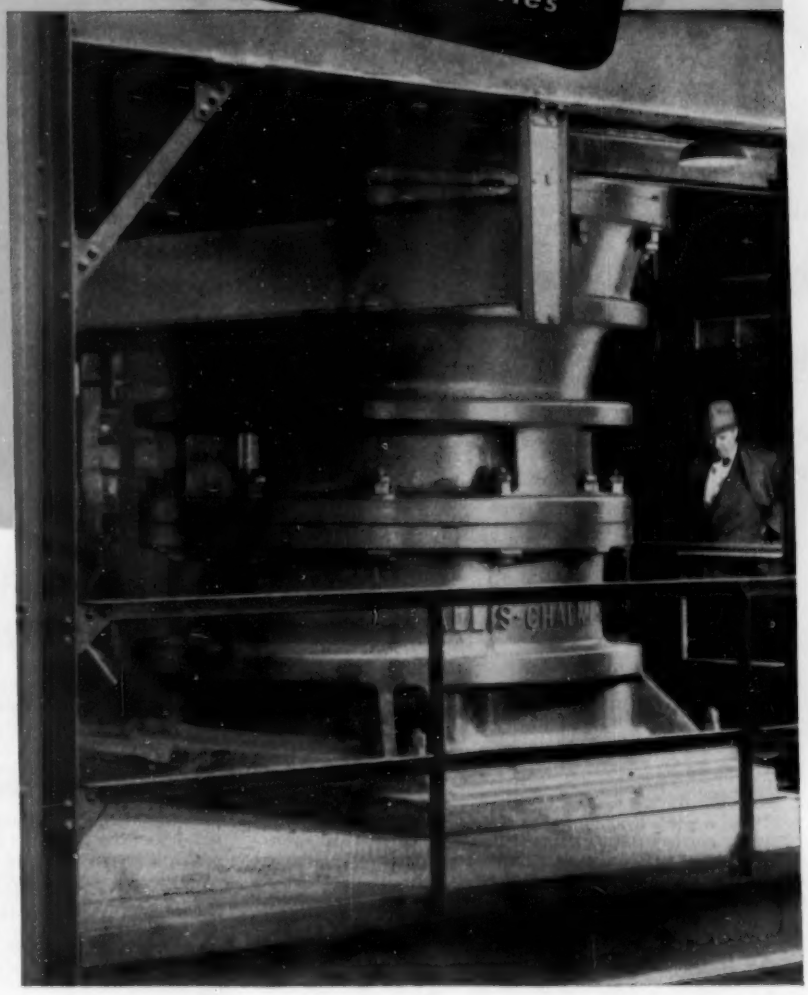
ALLIS-

Prominent in the modernization picture at Homestake are three 9 by 11-foot Allis-Chalmers ball mills. These mills, used in the amalgamation process, are equipped with combination drum and double-scoop feeders. Liners are of the Lorain type with hardened lifter bars. Ball additions are 1½ to 2 inches. The mills are driven by 450-hp, 1200-rpm Allis-Chalmers motors through speed reducers.

In each of Homestake's two crushing plants, a modern 30 — 55 *Superior* gyratory crusher has replaced two outmoded 17-inch primary crushers. The new crusher outproduces the combined tonnage of the old crushers and takes up less than half the space. The wearing quality of manganese steel mantles and the strength of short, rigid mainshaft have cut maintenance and parts replacement costs.

Superior is an Allis-Chalmers trademark.

ALLIS-CHALMERS
Equipment for the
Mining and Rock
Products Industries



For as Much Help as You Want or Need in Your Modernization Planning, Contact Allis-Chalmers

Your A-C representative, backed by industry's top technical team, is always ready to help you or your consultants. A-C interest in your problems does not end with the installation of equipment. Laboratory facilities, periodic checkups, maintenance and fast emergency parts service are yours continuously.

Crushers—all types
Vibrating Screens—all types... Grinding Mills—all types
Kilns...Coolers...Washers...Dryers...Smelting Equipment

CHALMERS

A-C ALLIS-CHALMERS

For complete information, call your Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wis.

Anaconda First to Roast Low Grade Sulfur Ore to produce SO_2 for Acid Manufacture

The world's first commercial installation for producing SO_2 gas from low grade sulfur ore, is now on stream at Anaconda Copper Company's plant at Weed Heights, Nevada.

The FluoSolids System that makes this possible includes four 18 ft. dia. Reactors plus other Dorr and auxiliary equipment. SO_2 gas is sent to a 450 TPD contact acid plant which supplies all acid requirements for leaching 11,000 tons of copper ore per day.

Feed to the system is 650 to 750 tons per day and gas production 26,000 to 30,000 C.F.M. Gas strength averages 8 to 12% representing a sulfur recovery of 98%. Unusual? Yes, because this is the first time that low grade sulfur ore could be recovered as SO_2 . . . economically. Here's how the system works . . . ore averaging 28% total sulfur is crushed to 10 mesh and fed dry to the Reactors which operate in parallel. Once ignition temperature is reached no extraneous fuel is needed. Ore is simply fed in at the design rate, latent heat in the bed immediately brings it to ignition temperature, and the fluidizing air oxidizes the sulfur to SO_2. Shutting down is a matter of minutes. And because the fluid bed stores sufficient heat, roasting can be started again after as much as 72 hours without adding additional fuel.

If you would like more information of FluoSolids . . . the most significant advance in roasting technique in the last 30 years . . . write The Dorr Company, Stamford, Conn., or *in Canada*, The Dorr Company, 26 St. Clair Avenue, East, Toronto 5.

FluoSolids is a trademark of The Dorr Company, Reg. U.S. Pat. Off.

Better tools TODAY to meet tomorrow's demand

DORR

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

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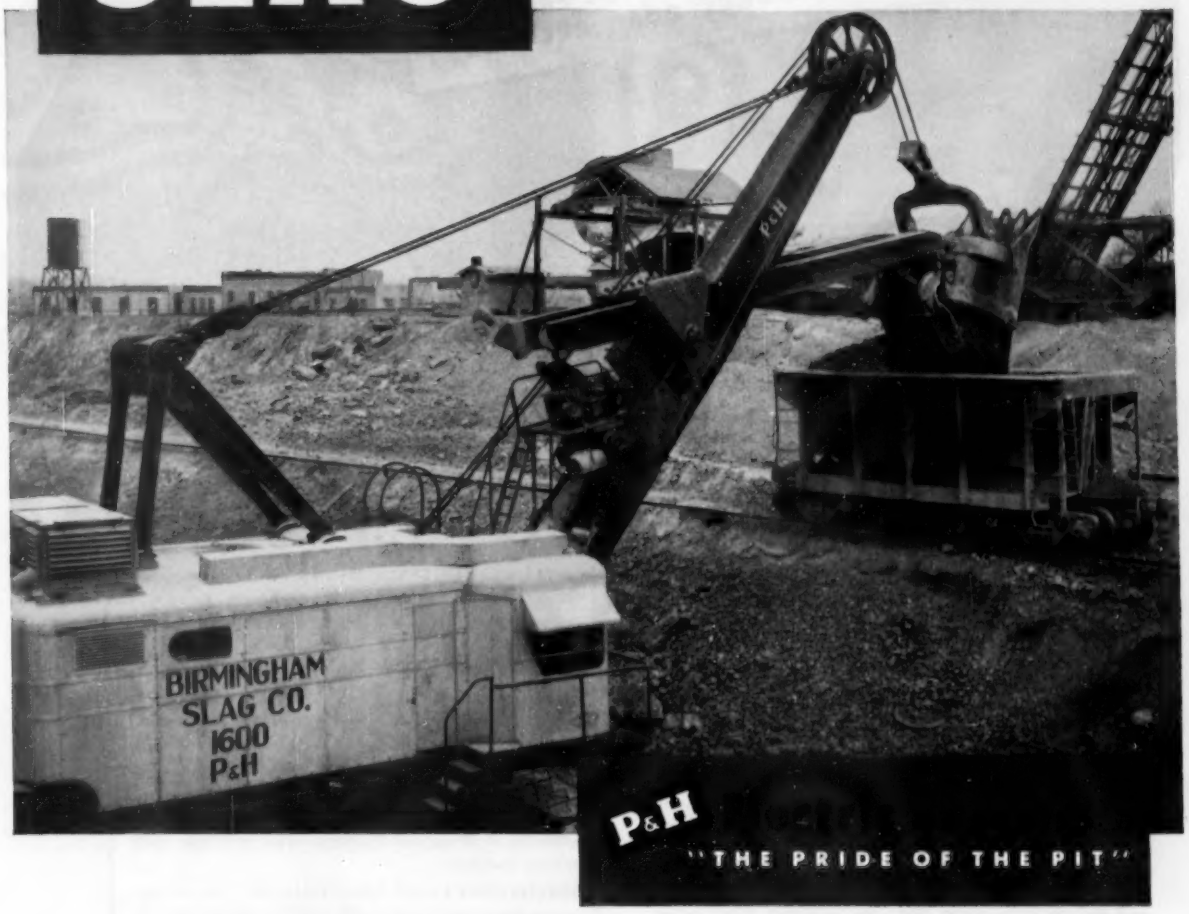
SLAG ...by the carload!



Birmingham Slag Co. has just put another P&H 1600 Electric Shovel into operation!

Why does Birmingham Slag go P&H?

The reasons are clear: P&H is the one machine that can consistently dig in steamy, corrosive atmospheres . . . atmospheres like those created when water cools hot slag. P&H Magnetorque* eliminates all DC commutators in the hoist motion — the corrosion trouble spot of ordinary machines. P&H electrical system is simpler, too — designed for shovel service . . . not adapted for it!

Bail pull is another Birmingham Slag consideration. For to reclaim old slag dumps left to "air cooling" requires a machine with stamina . . . a machine capable of digging in concrete hardness and keeping it up all day long. Here, again, P&H fills the bill! For with exclusive Magnetorque on the hoist drive, P&H Electric Shovels have the industry's highest bail pull . . . more power at the digging end — *where it's needed!*

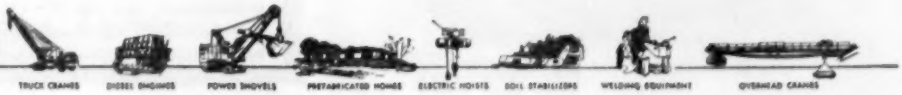
These are the kinds of advanced features you get from P&H. Full facts are in Bulletin X-139. Send for your copy today.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER
CORPORATION
MILWAUKEE 46, WISCONSIN

the P&H *Line*



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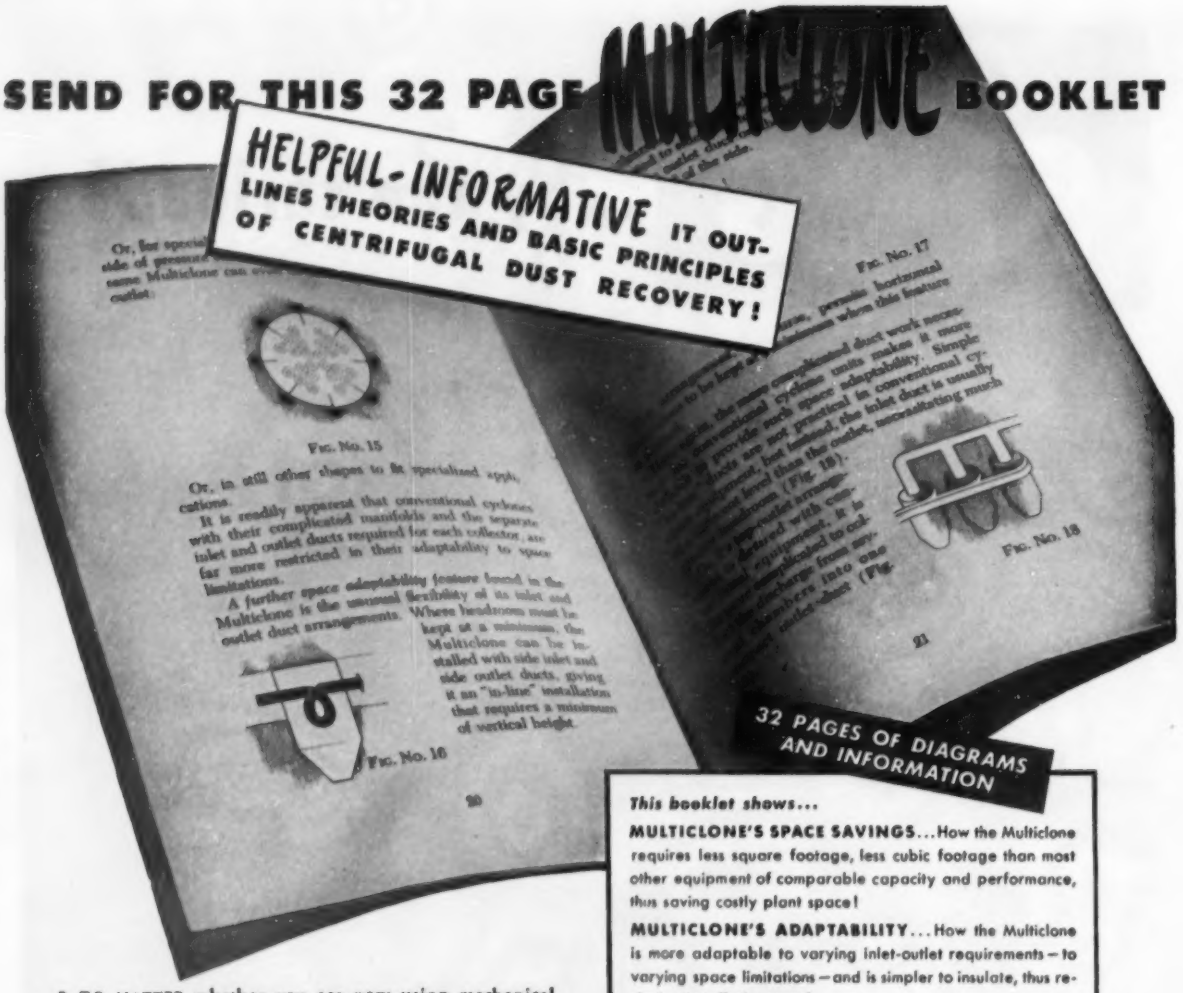
HELPFUL-INFORMATIVE IT OUTLINES THEORIES AND BASIC PRINCIPLES OF CENTRIFUGAL DUST RECOVERY!
Fig. No. 15
Fig. No. 16
Fig. No. 17
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32 PAGES OF DIAGRAMS AND INFORMATION

NO MATTER whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

In addition, this informative booklet illustrates and explains how MULTICLONE'S unique *vane* design is fundamentally different...how it makes possible greater compactness, simpler installation, high recovery of the small particles as well as the medium and coarser ones, and many other facts on MULTICLONE advanced design.

A limited supply of these booklets is available for free distribution to those interested in mechanical recovery equipment and methods. Write for your copy today.

This booklet shows...

MULTICLONE'S SPACE SAVINGS...How the Multiclone requires less square footage, less cubic footage than most other equipment of comparable capacity and performance, thus saving costly plant space!

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MULTICLONE'S LOW MAINTENANCE...How the Multiclone has no high speed moving parts to repair or replace, no pads or filters to clean or renew, nothing to choke gas flow or increase draft losses as suspended materials are recovered. Multiclone draft losses remain uniformly low—recovery efficiencies uniformly high—at all times!

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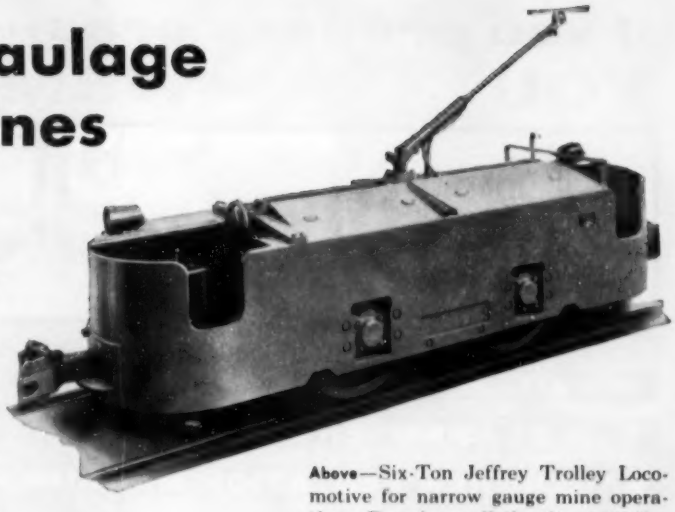

Above—Six-Ton Jeffrey Trolley Locomotive for narrow gauge mine operations. Drawbar pull (level)—3000 lbs. Haulage capacity—150 gross tons with roller bearing cars; 100 gross tons plain bearings.

Left—Jeffrey 27-ton Eight-Wheel Trolley Locomotive. Drawbar pull (level)—13,500 lbs. Haulage capacity—675 gross tons with roller bearing cars; 450 gross tons plain bearings.

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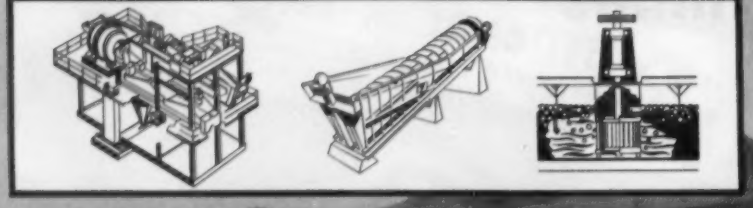

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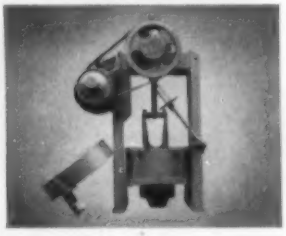

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Sizes and Types: WEMCO Thickeners are job-tailored to specific applications and are available in sizes up to 400′ diameter. Job requirements determine use of Beam (up to 45′), Lo-Truss (32′ to 60′), Hi-Truss (60′ to 100′), Center Pier (75′ to 175′) or Traction (125′ to 400′) type of construction.

Features: Depending on application, WEMCO Thickeners offer a wide choice of construction and mechanical features. These include: heavy duty worm or spur gear mechanisms and bearings; large feed wells; strong cast spiders; overload alarms; manual or motorized screw lifting devices on small sizes; vertical hydraulic lift on Center Pier type; chain and sprocket gear-motor drive on small sizes; dual fluid drive on Center Pier and Traction types; large diameter discharge cones; wood or steel tanks.

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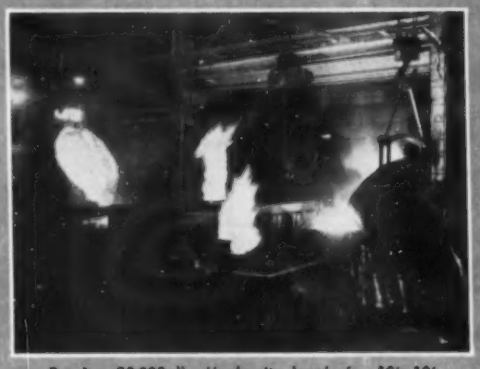
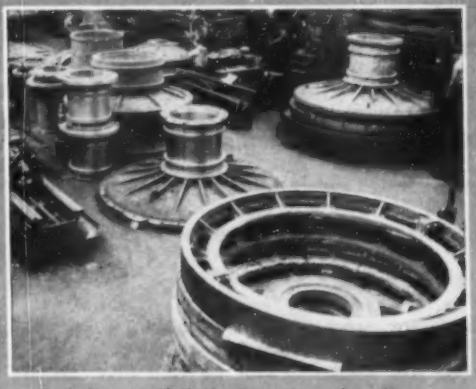


Pouring 25,000 lb. Meehanite heads for 10'x 10' Marcy Ball Mill, in Mine and Smelter foundry.



Typical group of Meehanite parts used on Marcy Ball and Rod Mills.

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Meehanite is a copyrighted trade name for a closely controlled iron, molded to rigid physical properties for uniform structure and strength, combined with good machinability. Meehanite metal is used in the construction of Marcy Mill heads, spur gears, bearings, and other castings. It has been selected for these uses since it is possible to have definite pre-determined and uniform properties for each application. Such properties may be varied to meet certain conditions and may be reproduced at any time without variation. Meehanite, due to its uniform density, high tensile strength, fatigue strength, rigidity and impact strength, provides qualities of toughness and resilience.

The use of Meehanite Metal is just one of the many Marcy Mill features which assure long, trouble-free operation and minimum maintenance... and which result in low-cost-per-ton production.

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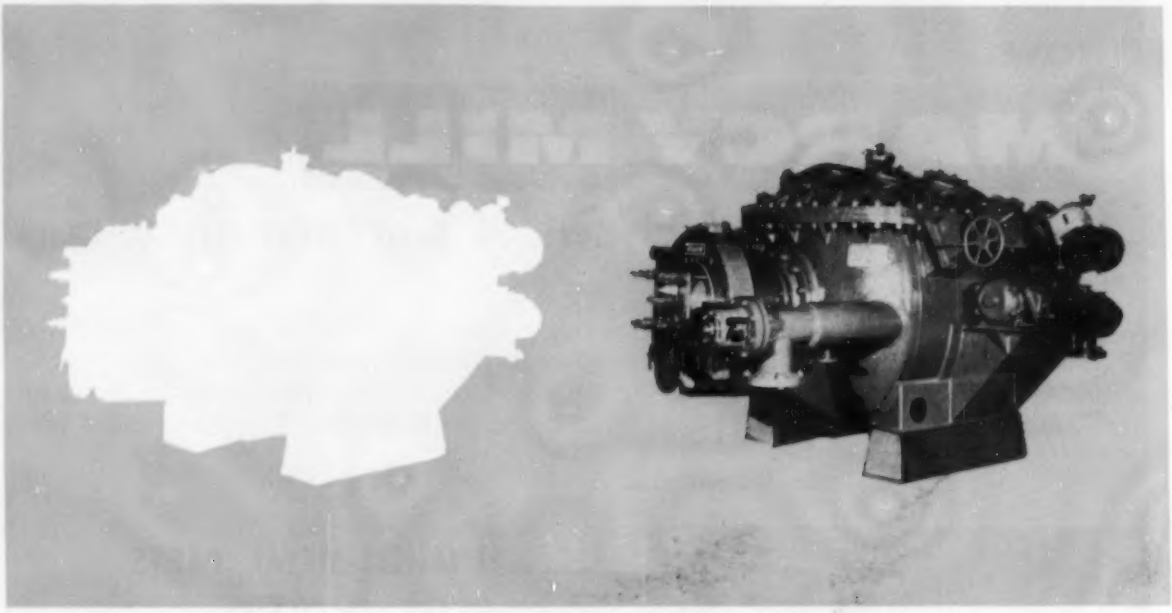

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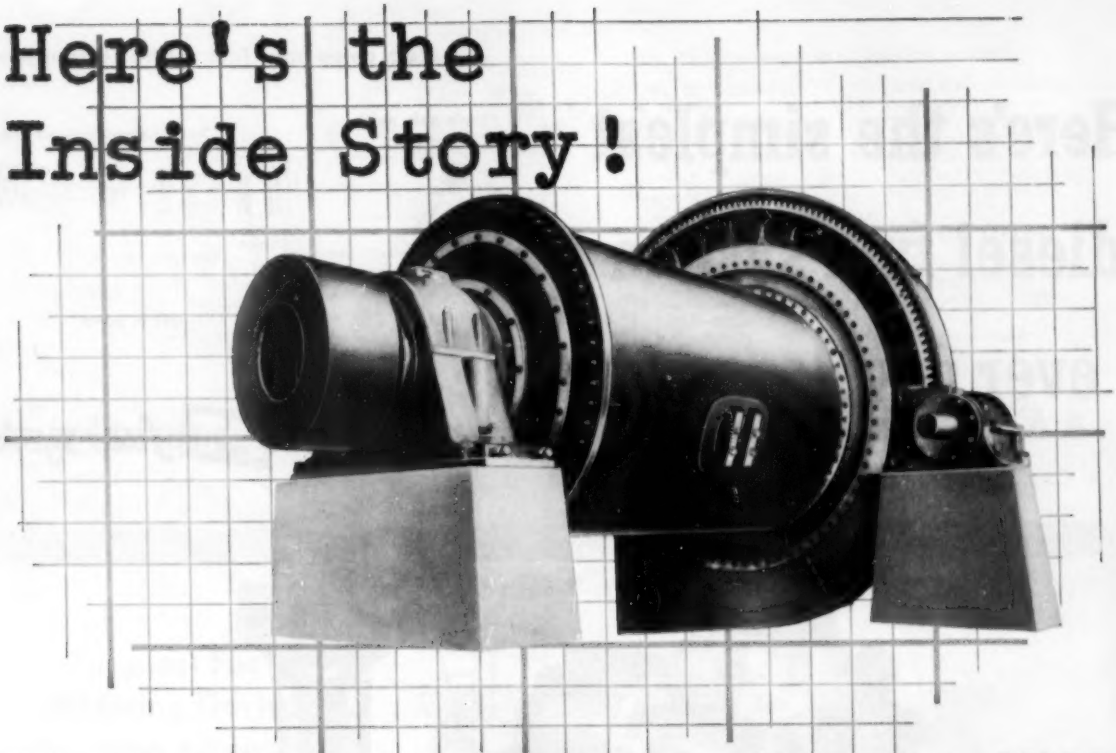

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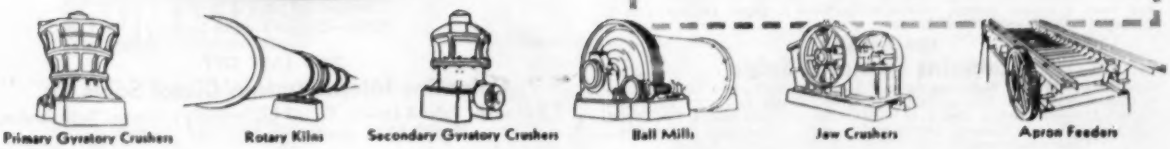

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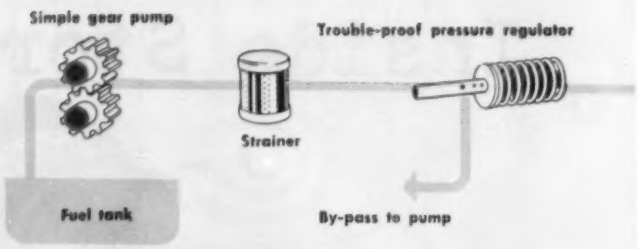
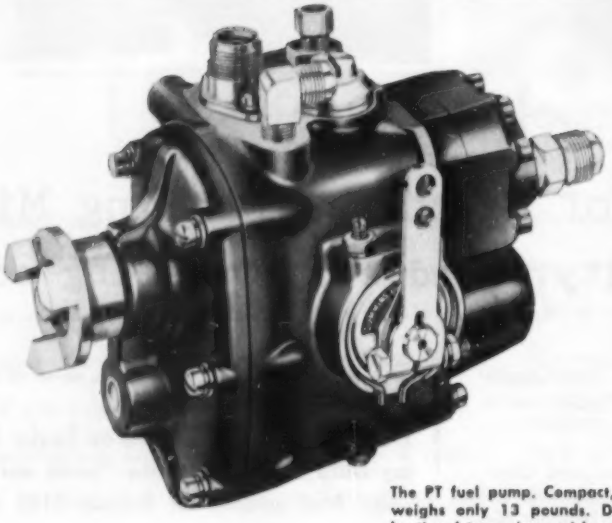
Simplest pump and fuel control arrangement



Cummins new PT *fuel system...*



The PT fuel pump. Compact, easy to handle, weighs only 13 pounds. Does not have to be timed to engine, quick and easy to install.

The PT injector utilizes the exclusive Cummins principle of fuel injection which has set the highest standards of performance and economy for more than 20 years.

THE revolutionary new PT fuel system, now standard on all Cummins Diesels, has fewer and far simpler parts than carburetor and ignition systems or ordinary diesel fuel systems. It is easy to understand, simple to work with, can be serviced by any mechanic. No longer any need for fuel system specialists! The PT fuel system has undergone two years of field testing and millions of operating miles under every conceivable condition. Its dependability record is phenomenal. Operators report even less fuel consumption than with earlier Cummins fuel systems and far less cost of maintenance. The PT fuel system can be installed on any Cummins Diesel built since 1932.

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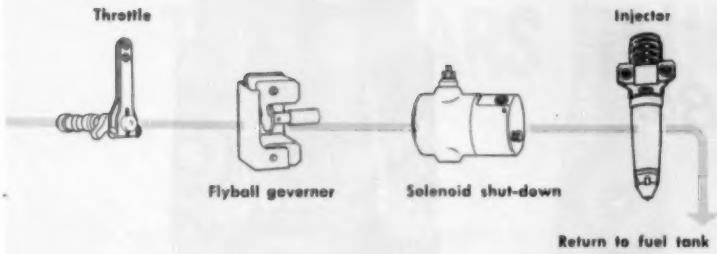

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- No wiring harness to short
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PT advantages over ordinary diesel systems:

- No fuel rack adjustments
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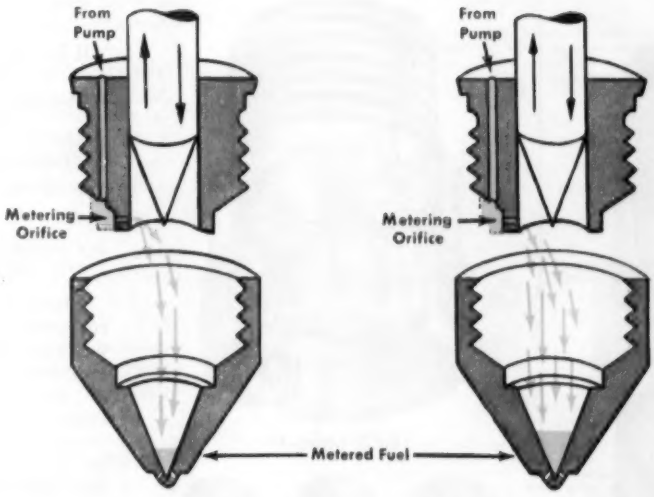
- No metering pumps
- No high-pressure fuel lines
- No fuel pump timing

...simpler to work with than gasoline carburetion and ignition

Simplest Fuel Metering Device

The principle is simply that the amount of fuel flowing through a fixed orifice varies according to the amount of pressure on the fuel. Pressure is controlled by the throttle on the PT pump. Fuel flow through orifice is cut off as injector plunger, actuated by engine camshaft, moves down to inject fuel.



When engine is under partial load, fuel pressure is low, and only a small amount of fuel passes through orifice into injector cup.

When engine is under full load, fuel pressure is increased, and greater amount of fuel passes through orifice into injector cup.

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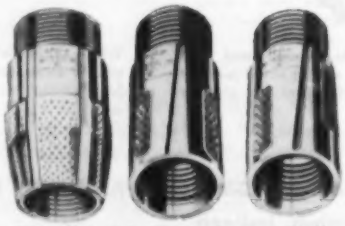

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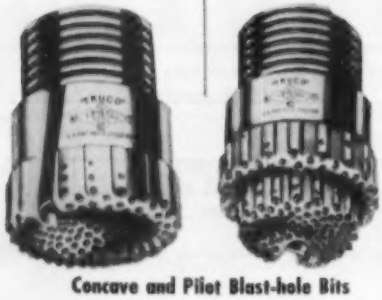

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Automatic
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We have spent 35 years designing automatic cars to meet every conceivable problem in mining. As a result, the bottom-dumping car is tops in the bituminous coal industry today. Certainly, hard rock miners can achieve the great economies of the automatic haulage system, too!

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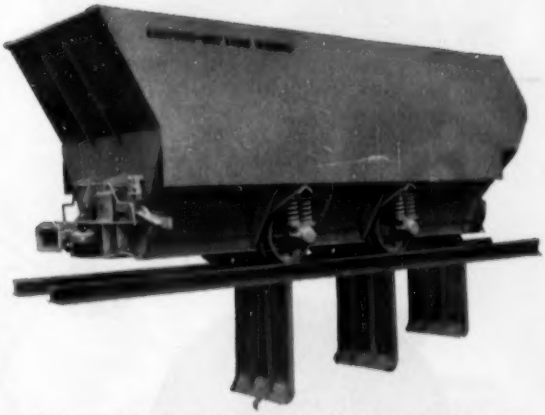

Total overall length of this S-D Automatic with overlapping ends is 15'6¼". Length of body not including overlapping ends is 12'6". (Overlapping end feature permits continuous loading without spillage between cars.) Car is 5'1¼" wide and 5'10½" high light weight. Trucks are spring mounted. Track gauge is 36". Level full capacity is 322 cu. ft.

Overall length of this S-D Automatic is 15'7¼". Length over end plates is 12' and width 5'8". Height is 30". This car was built for a 48" track gauge and has 41" door openings with 60" flare in order to shed sticky gypsum ore. Wide door openings accommodate large chunks of ore. Door plates are ½" thick with heavy stiffeners. Side plate is ⅜" thick. Level full capacity is 116.7 cu. ft.

The S-D Automatic shown above is 16'7¾" in length from center to center of couplers. Length over end plates is 13' and width 8'3". Height is 48" with light load, 47" with heavy load. This car was built for a 42" track gauge and has 60° flare slope for easy shedding of materials. Trucks are spring mounted. Doors are ½" thick with side and end plates ⅜" thick. Copper Bearing plate is used throughout. Level full capacity is 205.3 cu. ft.

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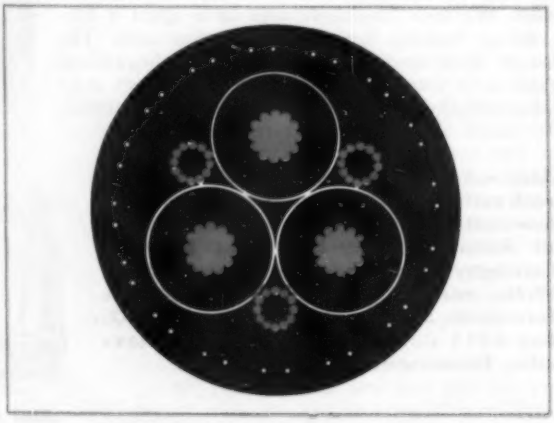
These are the things Anaconda salesmen hear daily about Securityflex Type SH-D Shovel Cable. Why not see *your* Anaconda Sales Office or Distributor for full information about this cable? *Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.* *Trade Mark 54338



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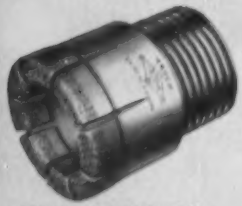

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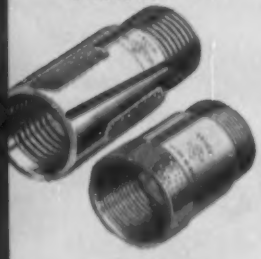

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A Mountain of Light, and a Star

When the royal crown is placed upon a British monarch's head, the soft lights of Westminster Abbey dance upon some of the most beautiful jewels in existence, including two of the world's greatest diamonds—the Koh-i-noor and the Great Star of Africa.

The Koh-i-noor, or "Mountain of Light," was found four thousand years ago in the legendary diamond fields of the King of Golconda. War, conquest, torture, theft, assassination and barter brought it to princes, moguls, shahs and rajahs, and brought tragedy, too, so the legend says, except when it was worn by a woman. Originally it weighed 800 carats, but cutting has reduced it to 106½ and greatly increased its beauty. It adorns the front of the Queen's crown.

The Great Star of Africa, set into the top of the royal scepter, weighs 516½ carats and is the largest cut diamond in the world. The original stone weighed 3,025 carats (about a pound and a half) and although it was the largest diamond ever found, was, obviously, but part of a much larger stone, still undiscovered.

The Great Star came from Premier Mine No. 2 in South Africa which produces many of the fine diamonds used in Truco Diamond Bits. Positioned with "cutting edge to the work," these diamonds give Truco Diamond Bits their irresistible cutting power; their ability to penetrate any formation, swiftly, accurately, thriftily, dependably, lowering rig time and cutting footage costs. May we send you the Truco Diamond Bit Catalog?

TRUCO DIAMOND BITS

by

WHEEL TRUEING TOOL COMPANY

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WHEEL TRUEING TOOL CO. OF CANADA, LTD.
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two-way side dumping eliminates truck tie-ups ... keeps rock production high

Assurance of constant, smooth flow of rock from quarry to crusher and elimination of costly truck delays have been achieved by Buffalo Crushed Stone Co. of Bowmansville, N. Y. through a flexible system of two-way side dumping at the crusher.

The greater flexibility of this system was achieved by converting from single truck units to truck-trailer combinations—thus doubling payload capacity for stepped-up production. Since all the dump bodies are designed for two-way dumping, the trucks can roll in on either side of the crusher. Remote-control overhead dumping system enables one man to control the feeding rate and the crusher operation. Feed is uniform...truck delay is eliminated.

Each of the six trucks hauls 28 tons in two side-dump bodies; 14 tons on the truck and 14 on the trailer. They handle grades up to 10% and roll at speeds up to 27 m.p.h. on the level. Each truck makes 22 trips daily between the quarry and the crusher, hauling a total of 3700 tons and using only 1.2 gallons of diesel fuel per hour per truck.

In switching to tandem operation, Buffalo Crushed Stone Co. knew they had a job calling for trucks that "have what it takes." Result: They bought Macks—six Model B-61 six-wheelers powered by Mack Thermodyne® Diesels, and equipped with heavy-duty Mack transmissions to meet stiff grade requirements.

On your job, too, Mack trucks can make the big difference by hauling more—for less.

2716

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A 20' long, 11'6" wide nodulizer section of a 10' x 150' Rotary Kiln ready for shipment from the Standard plant.

RUGGEDNESS . . .
Western Style

STANDARD

KILNS—CALCINERS
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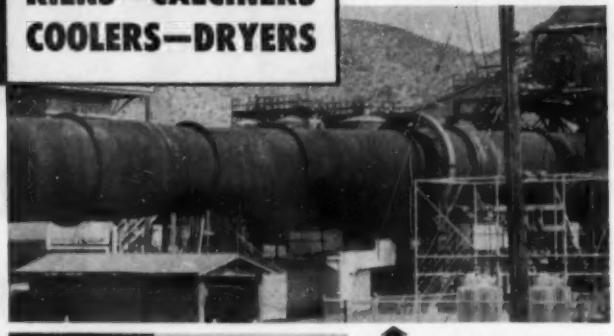
The illustrations shown here give added proof of the time-tested slogan—"It Pays to STANDARD-IZE". Here is just another example of Standard's ability to produce *rugged* rotary equipment for *any* job, large or small.

From all over the country—North, East, South, West — whenever the need is for dependability—the call is for Standard. See for yourself why the list of satisfied Standard users grows every day.

With over 50 years of precision engineering behind it, Standard is ready to help solve your problems—here or abroad. Write today for the complete Standard Story.



A small section of the kiln, installed and in use at a large western manganese company.

A close-up view of the same kiln. Note the solid construction. Standard Kilns are built to last.

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Open pit mines produce 78% of the nation's iron ore and 80% of its copper ore. Electric shovels dig the biggest percentage of this ore. With nearly 800,000,000 tons of open pit ore being dug annually, profitable production demands dependable shovel operation.

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TIREX, because of its Selenium Neoprene Armor, is unequaled for balanced resistance to abrasion, water, acids, oils, sunlight, and flame. Despite sharp ground material, accidental crushing, and temperature, TIREX can always be relied upon for dependable service.

To dig more from open pit mines through greater electrical shovel availability, specify Simplex-TIREX Cables. For added toughness, all TIREX Cables are cured in lead. Write to the address below for additional information.

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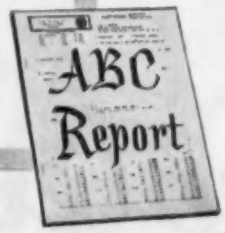
Paid subscriptions and renewals, as defined by A.B.C. standards, indicate an audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.



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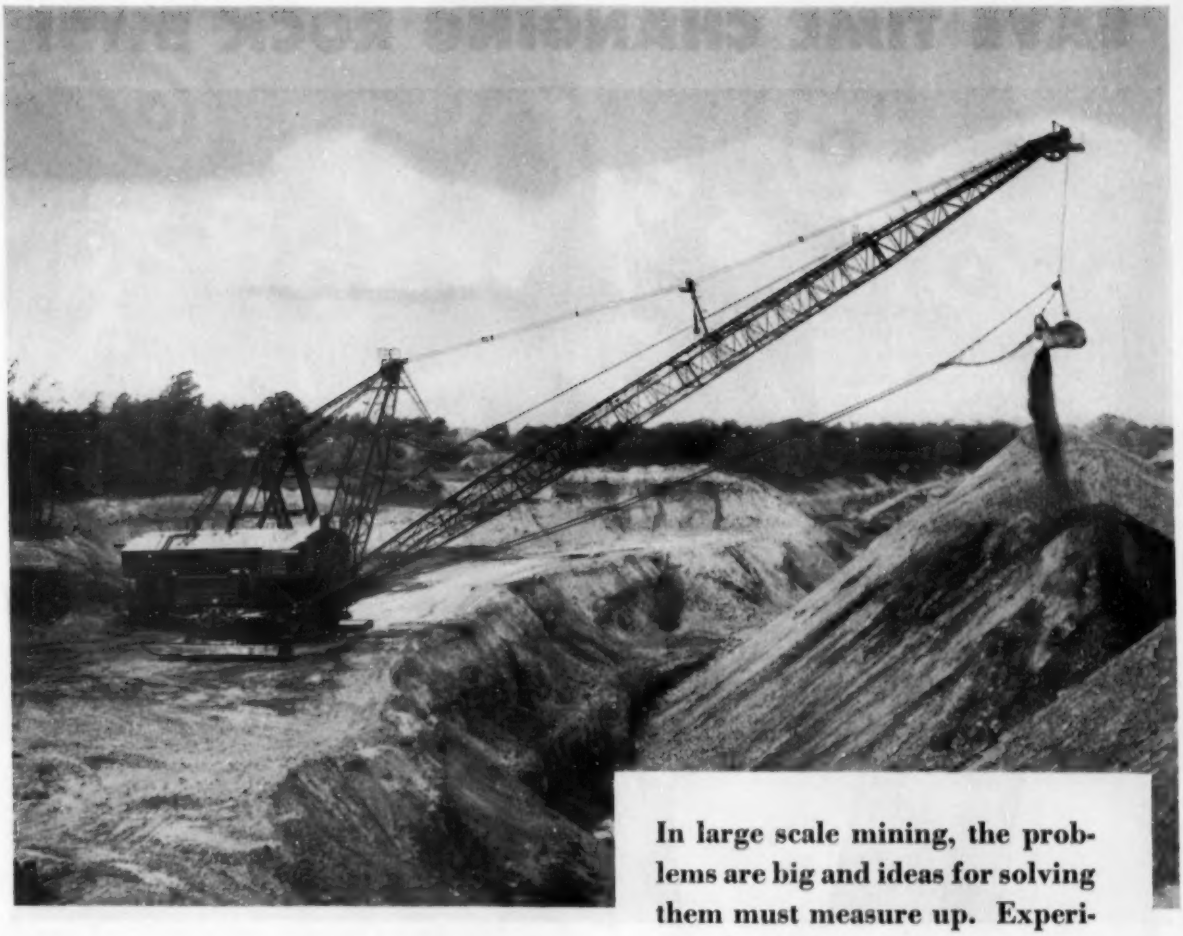
MINING WORLD

A.B.C. REPORTS—FACTS AS A BASIC MEASURE OF ADVERTISING VALUE



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In large scale mining, the problems are big and ideas for solving them must measure up. Experienced strip mine operators know that Bucyrus-Erie stripping shovels and draglines offer the right answer – really big output, along with dependability and economical operation. In addition they provide long working ranges, time-saving maneuverability, and the basic simplicity of design that means low maintenance costs.

If your mining operation requires the economical handling of big yardages, investigate Bucyrus-Erie stripping shovels and draglines. 17L54

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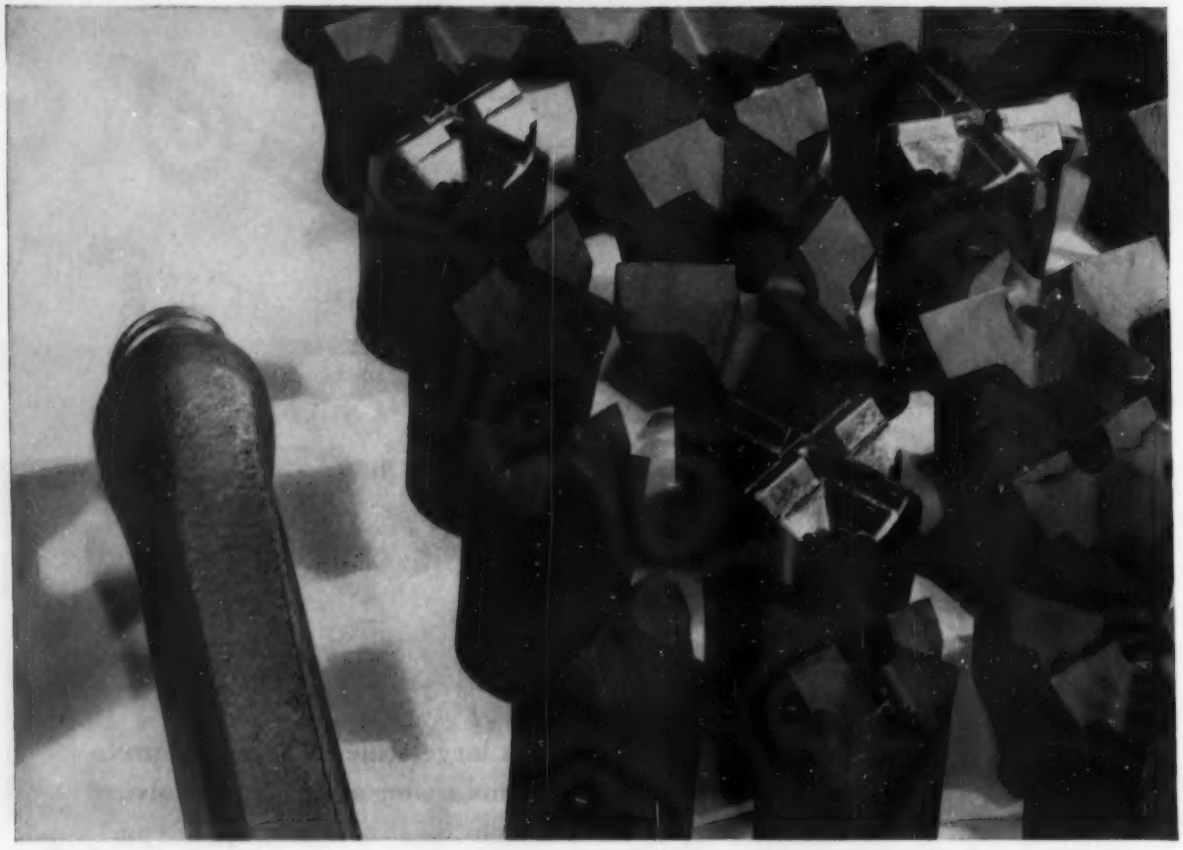


TIMKEN® multi-use, carbide insert bits, interchangeable on the same drill steel!

TIMKEN® multi-use and carbide insert bits save you valuable drilling time because they're interchangeable on the same steel. In a minute, a driller can unscrew one type of Timken bit and screw on another type. There's no time wasted going after another set of drill steels.

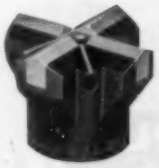
You save money, too, with Timken rock bits. Drillers can change to the most economical bits as the ground changes. And the need for keeping large inventories of drill steels is eliminated.

In either type of Timken rock bit—multi-use or carbide insert—you're assured of two important advantages. 1) Timken rock bits are made from electric furnace Timken alloy steel. 2) A special shoulder union keeps drilling impact from damaging threads.

Got a drilling problem you want solved? Call on our rock bit engineers. They're recognized experts in cutting drilling costs. And, of course, there's no obligation for this service. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

HOW TIMKEN MULTI-USE BITS SAVE YOU MONEY

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.



WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant gage holes, small-diameter holes, very deep holes.

... your best bet for the best bit... for every job

TIMKEN

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Drifts and Crosscuts

Metallurgical Research Pays

This is a research age and everyone knows the magnificant developments which have come out of the laboratories to make man's life both easier and better.

Within the last six months, metallurgical research has come of age. This research knows no geographical or mineralogical boundries in its goal to recover more metals in greater amounts from lower grade and more complex ores.

A most competent engineer and metallurgist writes from Africa as follows: "The major development in the mineral industries during 1954 must be considered as the formal opening of the new laboratories and pilot plant of the Research and Development Division of the Rhoanglo Mine Services."

In the United States the recent dedication of the Kennecott Copper Corporation's Research Center in Salt Lake City, Utah focussed attention on programs now under way in the United States. Equally important but not so well known is the research underway by Haile Mines, Inc. and Manganese, Inc. at Las Vegas, Nevada where work is pointed toward production of high-grade impurity-free synthetic scheelite from huebnerite and scheelite concentrates from the Hamme mine at Henderson, North Carolina. Another new research laboratory is in operation at Trona, California where American Potash and Chemical Corporation recovers 21 minerals and chemicals from Searles Lake brine.

The largest and least known metallurgical research centers, appropriately, are on uranium in many parts of the world. Rapid progress has been made on treatment of very low-grade ores.

The successful development and introduction of the new Dow flocculant, Separan 2610, is an outstanding example of the effectiveness of laboratory research. Dow metallurgists set out to produce such a compound. They realized the need for such, based on the fact that in many metallurgical processes there are two broad and divergent steps. First the breaking down or liberation of mineral particles and, second, the separation and collection of the various components. They reasoned that greatest opportunities existed in the second field and deliberately set out to find or produce a reagent that would serve as a coagulant or flocculant.

For the full report on their success read the Money Making Methods section on page 63.

Easier to Read

A recent letter from one of MINING WORLD's oldest readers and most ardent boosters, a retired consulting engineer now 85 years old, tells how he can only read by using a magnifying glass. He reads the magazine this way and enjoys it.

The October issue was good news to him because it was easier to read. It was easier to read too for the busy company president as well as for the chief metallurgist.

The use of a new type face, scientifically designed, for ease and speed of reading is just one of the many innovations in printing that have been done and are planned to make Mining World of more value to every reader. Every issue is jam packed with the latest operating ideas, money making methods, news of the industry, and personnel changes. It is only part of the Editor's jobs to make it easier for the reader to get more out of every issue. Hope you like the changes.

Good Luck Fluorspar Miners

The United States Tariff Commission on October 19th started its hearings on the fluorspar industry with particular emphasis on the effect upon the competitive position of the domestic fluorspar industry of the present tariff status of imported fluorspar.

Fluorspar miners, like lead and zinc miners, have been adversely affected by excessive imports of foreign produced acid grade fluorspar in the last 12 months. So serious has the situation become, particularly in the Illinois-Kentucky mining districts, that the United States Senate Finance Committee directed the Commission to make such an investigation. This is the same procedure that the lead-zinc producers followed only to have the President reject the Commissioner's unanimous recommendations for a tariff increase.

Secretary of the Treasury Humphrey in his recent "hardboard" decision clearly indicated that miners are not the only ones being injured by excessive imports. He acted to raise duties under the provisions of the anti-dumping act which gives him authority to impose extra duties on incoming shipments that "damage" domestic industries by selling goods at less than "fair value."

Industry observers believe that there will be no question but that the fluorspar producers can show definite damages and wide spread mine shutdowns and unemployment.

The governments of Peru, Canada, Australia, and Mexico led the fight against lead-zinc. It will be interesting to see if the governments of the following countries—which are sources of largest acid grade imports—Italy, Mexico, West Germany, Spain, and Canada have the same degree of power over the domestic miners of fluorspar.

4 REASONS WHY ALLIS-CHALMERS HD-15 AND HD-20

Do More Work... Stay on the Job Longer

Full-Length Main Frame takes the shocks, saves the rest of the tractor on all kinds of mining jobs — stripping, here, for example. Only such design lets engine, clutch, transmission "float" within the frame . . . protects them for their purpose — to propel the tractor.

Torque Converter Drive automatically selects the highest torque needed to move the load . . . keeps load moving at highest speed ground conditions permit. Here, pulling a scraper, torque converter loads fast and smooth, while hydraulic fluid absorbs any shocks to protect the drive train.

Top Tractor Balance. For front-mounted tools such as this shovel bucket, Allis-Chalmers tractors provide uniform weight distribution on the tracks. Lighter, more modern engine and main frame design reduces front overhang, allows closer coupling and frame mounting of tools . . . permit wider track shoes.

Longer Lube Periods. Truck wheels, idlers, support rollers and final drives need lubrication only once every 1,000 hours. Spring-loaded seals keep grease in, dirt and water out . . . allow tractor to work safely in muddy terrain when handling cleanup jobs, building haul roads.

HD-20

175 net engine hp
41,000 lb
Hydraulic torque converter drive

HD-15

109 drawbar hp
27,850 lb
Standard transmission

135 net engine hp
28,300 lb
Hydraulic torque converter drive

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Capitol Concentrates

ODM'S Plans For Long-Term Stockpile Raise Questions For Clarification

The Office of Defense Mobilization has finally issued the long-awaited announcement of the general framework of the "long-term" stockpile program.

The announcement of September 21 is in over-all terms and will require a good deal of clarification, especially in regard to specific materials. The general outline follows to a certain extent the language of the President's mineral policy announcement of March 26 and certain statements made from time to time by ODM Director Flemming. It also raises some interesting questions.

For instance, ODM officials said that in no event will barter be used to acquire materials of foreign origin for either minimum or long-term objectives if the same amounts of such materials are available from domestic production. Just where does this leave the plan to barter agricultural surpluses for foreign lead and zinc which was to relieve the import pressure?

Again, among the items scheduled for domestic open-market purchases is manganese. As far as we know, no domestic manganese ore is, or could be, offered at the current market price. At a GSA price 2½ times over the market, producers are not expanding phenomenally. So where does that leave domestic sellers on an open-market domestic purchase-directive? Perhaps the purchase directive section on manganese is intended to be just a gesture, as in the case of mercury, where the domestic ceiling was set far below the current market price and probably below most producers' costs. It would seem that chrome and some other items on the new list are in the same boat as manganese.

In view of the above, it seems more than a little cynical to say that the barter restriction quoted herein "is included to assure that there will be no impairment of the long-term stockpile program as a means of maintaining the domestic mobilization base," as ODM officials are quoted as saying.

• PMPC Report Mystery Explained

The speech of Assistant Secretary of the Interior for Mineral Resources Felix Wormser, on September 20, 1954, to the American Mining Congress is a prime example of how to make an agreeable sounding speech which reveals practically nothing. The Wormser speech did solve one mystery, however—what became of the report of the President's Minerals Policy Committee. Wormser said that this committee was appointed "several months ago." (We suppose that nearly a year actually is "several months.") Anyway, it appears that "any policy, to be effective, must constantly meet changing national and international conditions," and "there isn't too much that can be put down in black and white with the feeling that the subject is being disposed of permanently." Also, "the Committee naturally had to be guided by the carefully prepared report of the Randall Commission on Foreign Economic Policy."

Reconciling the various points of view and yet coming up with something which will placate domestic miners is a tough job and perhaps the longer the report remains buried the more comfortable life will be for the PMPC members!

• Titanium Contracts Are Awarded

Titanium seems to be the coming metal and one of the few products to which the government will still extend aid in the metal production field, by loans, floor price contracts, and quick tax amortization.

Oddly enough, ODM has not yet put ilmenite on the strategic list, even for DMEA exploration contracts.

• Copper Picture Is Puzzling

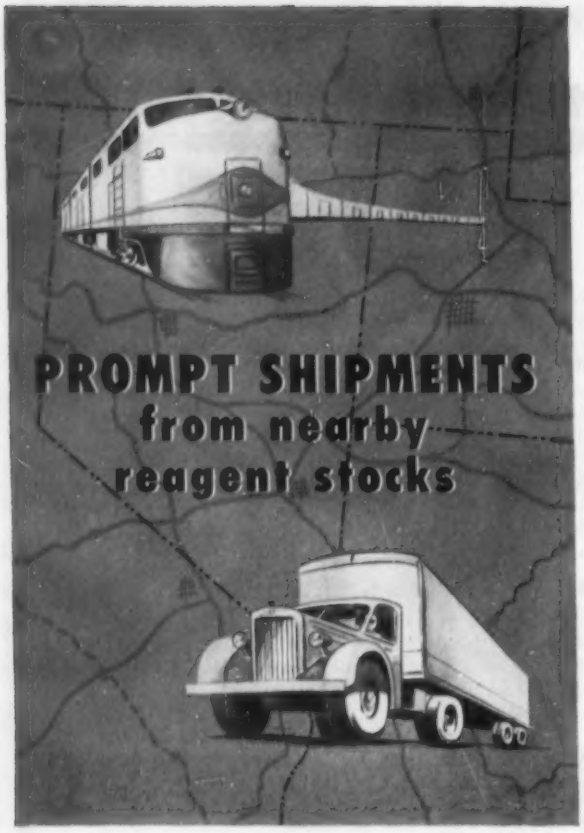
Under the "What Are You To Believe?" department now comes the copper supply situation. The trade journals have been crying "shortage" for some time. At the end of September the London market was above the New York market on a delivered basis. ODM and GSA were asked to divert copper, intended for the stockpile, into industrial channels. Yet the Copper and Brass Warehouse Association believes the situation is greatly exaggerated, saying, "the metal is in ample supply and copper production during the next year or two will be increasing by nearly one-fourth." In the meantime the President of Chile is rumored to be trying to negotiate a deal to swap copper at 29 cents for prefabricated houses from Europe.

• One Way To Reach A "Settlement"

The conditions under which American capital in foreign countries has to work is illustrated by the "settlement" of the copper strike in Chile. The government and the workers "settled" on a 26 percent wage increase without consulting the operating company. Very likely the company will agree—after all, the original demand was a 75 percent increase—but what choice does it have anyway?

• Celler Joins Low-Tariff Chorus

Another voice has been added to the low-tariff chorus. Representative Celler (D) of New York is advocating complete revocation of all tariffs on strategic materials. Somebody got up for him a plausible



Western mills benefit doubly by Cyanamid Service on their complete reagent requirements.

We offer a comprehensive stock of flotation reagents and other metallurgical chemicals for both metallics and non-metallics . . . with added economy in both transportation costs and balanced inventories through combination shipments from nearby stocks.

Cyanide and Flotation Reagents in active demand are available from strategically-located stock points. Orders may be placed with our New York office or with American Cyanamid Company, 1440 Broadway, Oakland 12, California; El Paso, Texas; c/o Weicker Transfer & Storage Co., Denver, Colorado; or c/o Goodwin & Mayflower Moving & Storage Co., Spokane, Washington.

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but quite phoney story, although his discussion of the absurdity of the tariff on nickel (of which all but 3.0 percent is imported) has more validity than one would like to admit. However, be it noted that Congressman Celler only advocates abolishing the duties on raw materials. Perish the thought that duties should be dropped on *manufactured goods*. His constituents wouldn't like it!

• Aid to Coal Areas Authorized

The Foreign Operations Administration is to be used as a medium to aid distressed coal mining areas. The President has approved the delivery of some 10,000,000 tons of coal, to be mined in distressed areas, to "under-developed areas of the world" particularly in Africa, Southeast Asia and Spain. The coal which will go to Spain, it is said, will be paid for by charge-offs against the cost of the Spanish-American air base program. This is a pretty neat trick and it is too bad nobody wants our lead and zinc on the same basis.

• Partial Clarification of Manganese Memo

Part of the inconsistency contained in the domestic manganese memorandum of August 18, 1954, has been explained by ODM Director Flemming. He has clarified the portion of the memo which, while criticizing the depot purchase programs for costing too much, stated that the car lot program to which the same prices apply might be expanded under certain hypothetical conditions set forth in the memo.

Flemming has stated in a recent letter: "There is a definite security advantage in obtaining ore ready for immediate use. Where low-grade ore is purchased, a beneficiation plant must be built and two years or more may be required to obtain an end product, the composition of which cannot be known with certainty. Furthermore, the car lot program is available to all producers of specification-grade ore whether or not near the purchase depots, and thus broadens the production potential."

The original memorandum was, to say the least, pretty cloudy on the point of possible expansion of the car lot program, but Flemming now says, ". . . it is intended to increase the quota of 19,000,000 units, if achieved before the termination of the program (June 30, 1958), so as to permit acceptance of all offers of specification-grade ore through the life of the program. We have not made any decision on the question of extending the termination date of the program."

More recently ODM-GSA announced a new "long-term" domestic purchase program, the material to be purchased "at the market." As foreign manganese can be bought at around 75 cents a unit, that figure, presumedly is the market. It would be interesting to see the ODM survey showing that domestic producers can mine and ship at the current price, and how much material is expected to be purchased.

Certainly as long as manganese can be shipped at the $2.30 per unit base price under the GSA car lot program producers would have to show distinct signs of insanity to sell at 75 cents. Western Congressmen should ask what will happen to our domestic manganese industry, under the new "buy-cheap" plan, after the purchase depot and car lot programs are ended, and how the new plan will expand the domestic mobilization base, to use a popular ODM phrase.

"Tell me...how can we stop overloads from cooking our cable?"

"We can't always control overloads on our shuttle car cable. But the damage it does has got to be stopped. It raises blisters . . . which makes our cable easy to tear. And you know . . . because of that heat the jacket on the bottom layer of cable on the reel hardens and cracks. That raises hob with cable life! What can we do?"

"You'll put a stop to the trouble if you do this..."

"One of the most important things is to choose a cable with adequate current rating. Your cable or mining machine manufacturer can help you here. You can help avoid trouble *in the mine*, too. When you remove cable for permanent splicing . . . reverse the ends. And when you are working only a short distance from the power source, remove your cable from the reel and place it where it will be well ventilated. Finally, remember that you generally get what you pay for – one breakdown in a cheap cable costs you *more* than you save by buying on price."

New AnacondA Cables last longer and are safer!

In 15 mines recently surveyed, ANACONDA Cables on shuttle cars are lasting up to 300% longer than cables used only a few years ago. Why? Anaconda cable jackets are made of a new neoprene formula which assures better protection against hard wear. Improved cold rubber insulation has high heat stamina. An improved stranding flexes better under tension. And a new type breaker strip insures better short-circuit protection. It all adds up to *real economy* in use. See your Anaconda Sales Office or distributor. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.* 54330

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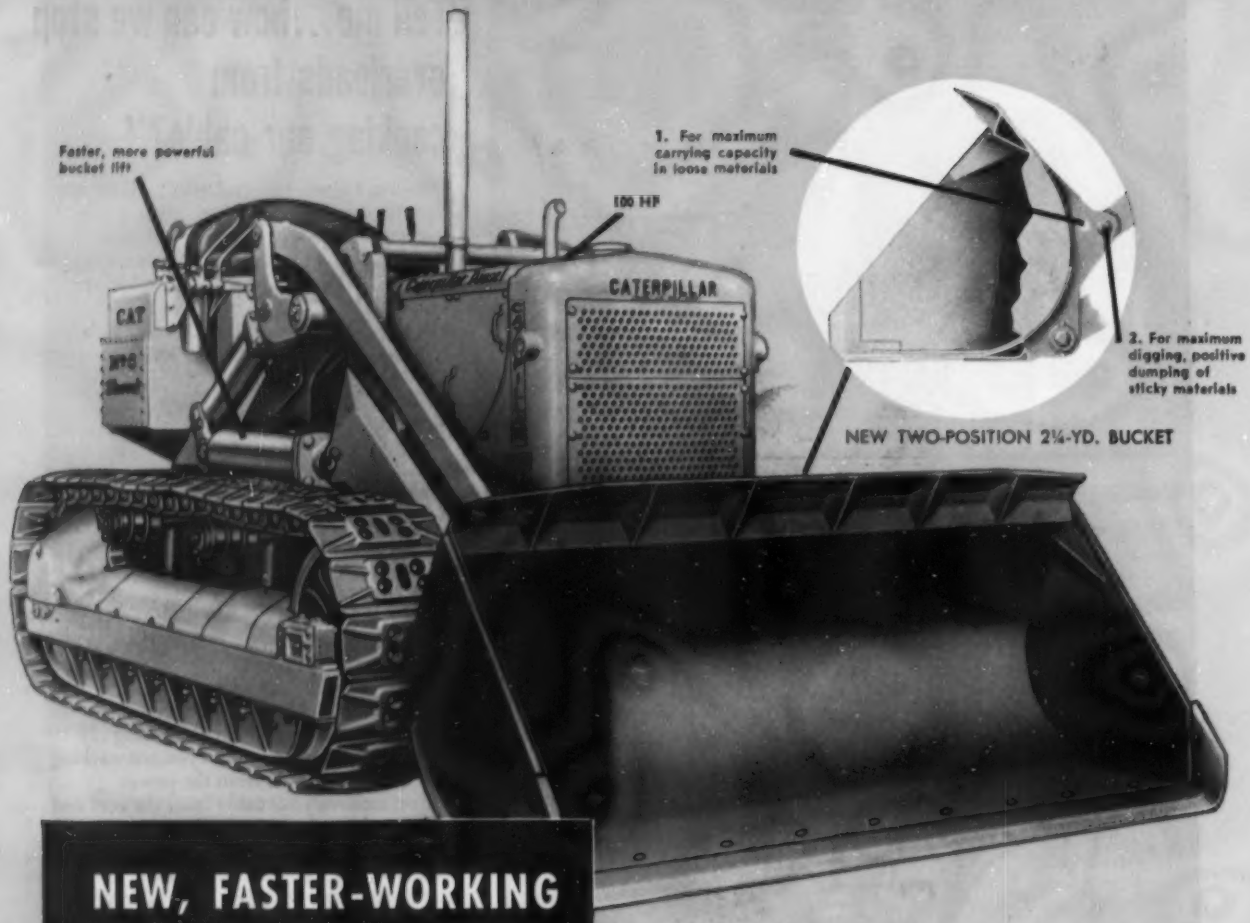
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CATERPILLAR
CAT
1. For maximum carrying capacity in loose materials
2. For maximum digging, positive dumping of sticky materials
NEW TWO-POSITION 2¼-YD. BUCKET

NEW, FASTER-WORKING NO. 6 SHOVEL at no increase in price

NEW POWER—the CAT* Diesel Engine now gives you 100 HP, an increase of approximately 25 per cent—and you get it with Caterpillar ruggedness and economy.

NEW 2¼-yd. BUCKET gives you 12½ per cent more capacity, gets heaping loads, dumps cleanly. Exclusive two-position feature gives maximum use of bucket capacity in *any* material: rear position for clean, fast dumping of sticky materials; forward position for carrying heaping loads of loose materials.

GREATER LIFTING POWER and speed with new hydraulic pump: its pressure is stepped up more than 40 per cent for fast, positive lifting action under *all* load conditions.

These extra values cost you no more in price!

These useful attachments increase your job range: skeleton rock bucket, quarry bucket, heavy-duty narrow bucket and bulldozer blade.

Versatile new No. 6 Shovel is built to do more work at less cost

Weight distribution, engine horsepower and bucket capacity are carefully balanced so that the tracks *stay* on the ground for maximum stability.

Your Caterpillar Dealer will be glad to demonstrate the new No. 6 Shovel *on the job*. See him today. And count on him for fast service and genuine factory parts.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill., U. S. A.

CATERPILLAR*

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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

November, 1954

INTERNATIONAL PANORAMA

TACONITE, MINNESOTA—First shipment of iron concentrate has been made from Oliver Iron Mining Division's new Plummer mine and beneficiation plant. Capacity is 1,200,000 annual tons.

WASHINGTON, D. C.—Tungsten production during the first six months of 1954 was at an all-time high rate. Mine output was 6,209 short tons of 60 percent WO_3 concentrate.

BAKERSFIELD, CALIFORNIA—The Miracle Mining Company has sold its uranium claims in Kern River Canyon for $1,000,000. Uranium was discovered by holding a Geiger counter out of an automobile while driving up the canyon.

SPRUCE PINE, NORTH CAROLINA—The GSA mica purchasing depot here has bought $3,468,722 worth of mica in the last 24 months. Average price per pound in August was $14.55 for ruby and $14.63 for nonruby.

BARTOW, FLORIDA—American Cyanamid Company has purchased about 1,000 acres of phosphate-bearing land southeast of here for more than $700,000.

TORONTO, ONTARIO—Algoma Uranium Mines Limited has found ore grade uranium 6,000 feet down dip from the outcrop in a vertical diamond drill hole. The main conglomerate bed averaged 1.6 percent U_3O_8 over 6.5 feet.

CLIMAX, COLORADO—Climax Molybdenum Company set an all-time daily production record of 32,565 tons in September. Phillipson level production was 20,890 tons and Storke Level 11,675.

LUDERITZ, SOUTH WEST AFRICA—Industrial Diamonds of South Africa (1945) Ltd. has discovered a raised diamond-bearing marine terrace with diamonds similar in quality to those presently mined at the Saddle Hill terrace.

SINGAPORE, SINGAPORE—A new mining lease for 247 acres of tin-bearing ground has been secured by Kampong Lanjut Tin Dredging, Ltd. at Selayang.

KITWE, FEDERATION OF RHODESIA & NYASALAND—Future coal supplies for the "copper belt" smelters and refineries may come from a newly developed district in nearby Tanganyika. Coal is now being imported from as far away as the United States.

SALT LAKE CITY, UTAH—A four-week strike of the United Steel Workers at the Garfield copper smelter of the American Smelting and Refining Company ended here September 12th. Strike end meant resumption of operations at Kennecott Copper Corporation's eletrolytic refinery.

ADELAIDE, AUSTRALIA—Important nickel-bearing outcrops have been found in South Australia by Gold and Mineral Exploration NL.

GRAND JUNCTION, COLORADO—Flanders Mining Company has purchased the entire assets of the Gateway Mining and Development Company for $1,250,000. More than 150 uranium claims involved in the sale are located on Beaver Mesa in Mesa County, Colorado and Grand County, Utah.

CARLETONVILLE, UNION OF SOUTH AFRICA—West Driefontein Gold Mining Company Limited has completed the highest headframe in South Africa at its No. 5 shaft. The 211-foot-high reinforced concrete headframe houses two Koepe hoists at the top.

BUTTE, MONTANA—Operations have been resumed at the Butte mines of Anaconda Copper Mining Company following settlement of a 46-day strike which began on August 23.

Cyprus Options Pima Copper Mine In Arizona

The Cyprus Mines Corporation with headquarters in Los Angeles, California, has secured a purchase option on the property of the Pima Mining Company in the Mineral Hill mining district south of Tucson, Arizona. Cyprus is making an investigation of the property.

The Pima ore body was discovered by geophysical prospecting by the United Geophysical Company which started in 1949. Since that date an underground mine has been developed with 7,000 feet of work on four levels. From this development, and some stoping, about 60,000 tons of copper ore averaging just under 6.0 percent copper have been mined and shipped to a copper smelter. Some 50 percent of this ore was from development. See the October 1954 issue of MINING WORLD, pages 42 through 45 for a report on the discovery and development.

In the last six or seven months, Pima exploration and development work has made a re-evaluation of the economic possibilities of the deposit necessary. It now appears that it is not a relatively small high-grade deposit but can more correctly be considered as medium large but low grade. Limits of mineralization have been extended to the east by surface churn drilling and underground diamond drilling. A large tonnage of serpentized dolomite on the footwall appears to average better than 1.5 percent copper with a 1.0 percent zone in the same rock on the hanging wall.

The Pima now appears to offer attractive possibilities for a good small open-pit mine. Depth of the alluvial overburden is 200 feet necessitating a high stripping ratio but removal costs should not be high per yard in the unconsolidated material.

Bethlehem Finds Iron Ore In South West Africa

The discovery of two major iron ore deposits in the Kaokoveld region of South West Africa has been reported by the Bethlehem Steel Corporation. The report was made upon completion of a two-year survey and prospecting program.

Production from the property would involve the establishment of a harbor, the construction of a 110-mile-long rail line, and the installation of equipment at the deposits for a possible output rate of 3,000,000 tons of iron ore annually.

Tungsten Ore Depletable Too

The rate of depletion for tungsten ores under the Internal Revenue Code of 1954 is 23 percent. This rate applies to tungsten, as well as the other ores listed by G. S. Borden in his article on the "New Tax Law" in the October issue of MINING WORLD.

FIVE-STAGE TEST PUMP being installed to determine if the various sections of mine workings to be unwatered were still interconnected.

C&H Pumps Gas-Laden Corrosive Water From Deep Osceola Lode

The unwatering of the Osceola Lode in the Copper Country of Michigan's Upper Peninsula by the Calumet Division of Calumet & Hecla, Inc., represents what is believed to be the largest underground dewatering pumping operation in the world. In order to make the Osceola Lode accessible for mining, approximately 7,000,000,000 gallons of water (about 30,000,000 tons) will have to be pumped. When this is accomplished known ore reserves made available for mining down to the 6,000-foot incline level will amount to 11,000,000 tons from which 209,000,000 pounds (104,500 tons) of copper will be recovered. The Calumet Division will continue to produce quality "Lake" copper for many years.

The large amount of water to be removed would, under ordinary conditions, present many problems. At the Osceola they were compounded by unusual and difficult conditions created by large concentrations of chlorides and explosive gases contained in the water.

The expelled gases consisted of approximately 50.0 percent methane, 5.0 percent hydrogen and 45.0 percent nitrogen, representing as much as 14.0 percent of the total volume of the water. These gases were held in solution in the water under pressure of the overlaying water. This meant that it was necessary to find a method by which the water could be removed without allowing the gases to escape into the mine workings.

Chlorides contained in the mine water were in the form of calcium, sodium, and magnesium. The total chloride ion was as high as 64,920 parts per million. Corrosiveness resulting from these chlorides precluded using pumps and pipe of ordinary construction, thereby entailing additional problems.

In unwatering the Osceola Lodes, Calumet Division engineers were the first to accomplish a number of outstanding feats, some of which are:

1. One of the world's largest underground pumping operation ever attempted.

2. Unique means of sampling the mine water.
3. Using submersible pumps at a greater mine depth than ever before.
4. The first time that submersible pumps have ever been used for other than vertical settings.
5. A method and use of coating pipes with synthetic rubber as a protection against the corrosive mine water.
6. Highest electrical voltage ever taken underground through one cable.

The Calumet Division engineers who have so remarkably solved the many problems encountered in unwatering the Osceola are shown on accompanying page.

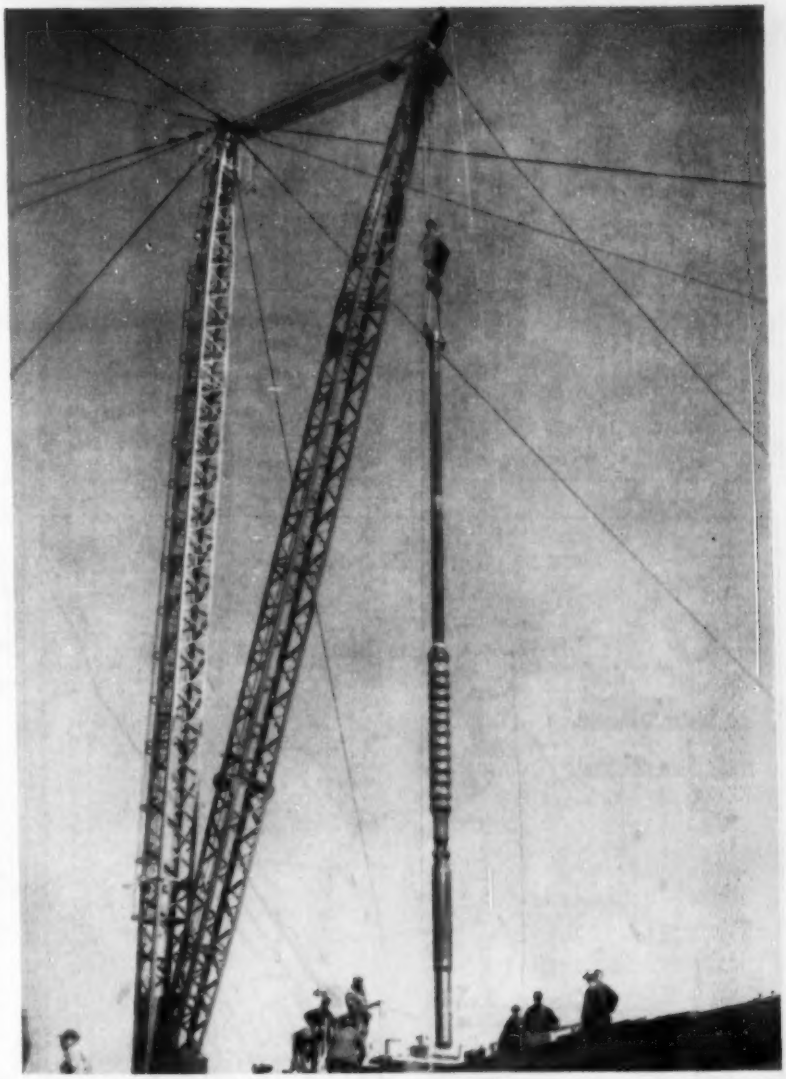
Parallel Veins Dipping 39°

The Osceola Amygdaloid, the cellular top of a basaltic lava flow, and the Calumet Conglomerate, a bed of conglomerate interstratified with the thick flow series, form the two horizons which are the hosts for the Osceola and Conglomerate ore shoots or lodes. These two parallel lodes dip at an angle of approximately 39° to the northwest and are separated horizontally by 750 to 800 feet of barren flows. The two lodes vary in thickness from 7 to 20 feet, and pockets in the highly irregular Osceola lode occasionally widen to 40 feet or more.

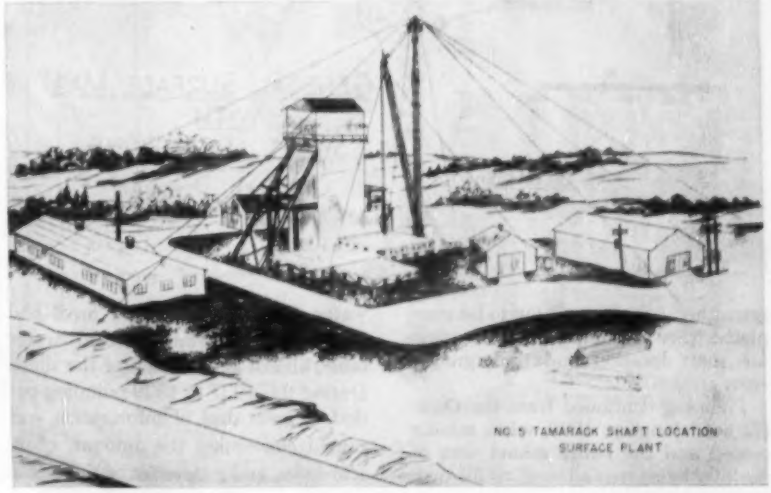
While the horizons themselves have been recognized over a distance of many miles, the ore is restricted to a structurally limited shoot or lode. Both the Osceola and Conglomerate lodes, which partially overlap, are about two miles long. The richest mineralization, native copper, occurs near the surface. In the Conglomerate lode increasing thickness compensated for the decreasing grade and the pounds of copper per foot of depth were roughly constant to the deepest workings at 5,000 feet deep vertically.

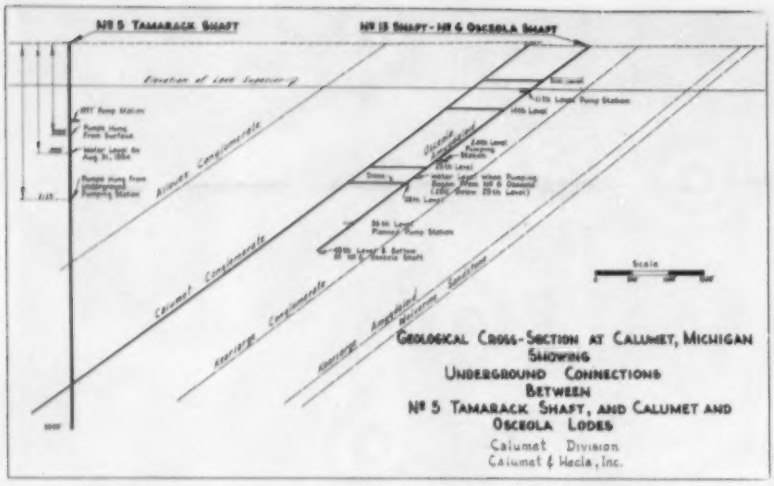
Mining Began in 1860's

Mining first began from the Conglomerate in the 1860's and from the Osceola in the late 1870's. Operations continued intermittently until 1932 when, because of adverse economic conditions, Calumet & Hecla decided to abandon the Conglomerate. A retreating system of mining began, removing old backs and shaft pillars. As this work progressed, water was allowed to accumulate in the lower levels until March, 1937, when it was necessary to begin pumping. This pumping was done from the Osceola, which is connected to the Conglomerate on the 28th level of the No. 13 shaft, in order to hold the water below the 28th level, thereby enabling the



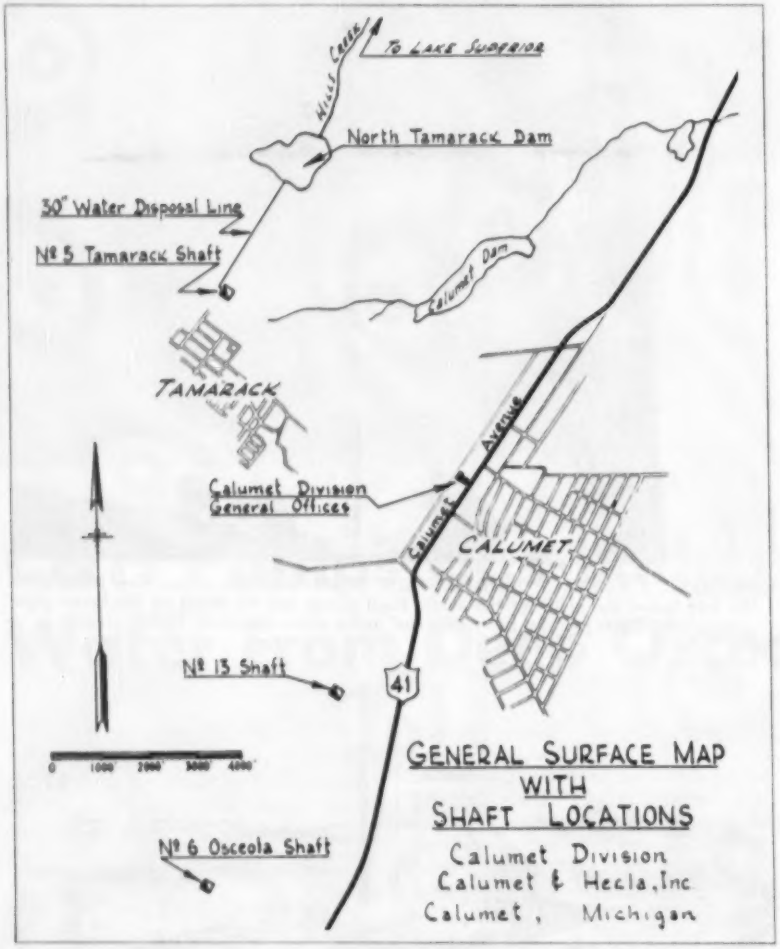
LOWERING A 12-STAGE SUBMERSIBLE PUMP with the 75-ton Guy derrick to 1,250 feet below the collar of the shaft. Each pump and its string of discharge pipe weighed 72,000 pounds, the pump and motor alone weighing 10,000 pounds.





GEOLOGICAL CROSS-SECTION AT CALUMET, MICHIGAN SHOWING UNDERGROUND CONNECTIONS BETWEEN No 5 TAMARACK SHAFT, AND CALUMET AND OSCEOLA LODES

Calumet Division
Calumet & Hecla, Inc.



GENERAL SURFACE MAP WITH SHAFT LOCATIONS

Calumet Division
Calumet & Hecla, Inc
Calumet, Michigan

retreating system of mining to be completed (See accompanying drawings for shaft location and underground cross section).

Pumping continued from the Osceola until January, 1939, when mining ceased and the entire mined area of the two lodes was allowed to fill with water. By 1943 the water level had reached the existing ground water table, almost at the collar of the shaft. During this 1937 to 1939 pumping period, a great deal of information was gained concerning the amount, characteristics, and properties of the water accumulating in the lodes which later proved to be of immense value.

Decision to Unwater Osceola

In 1948 all available data were gathered and evaluated to determine the economic feasibility of reopening the Conglomerate and Osceola Lodes. A decision was made at that time not to undertake the project.

Then in 1950, because some of the company's operating mines were approaching depletion, a committee was appointed to reconsider the possibility of resuming mining of these lodes.

Information on hand was substantially complete, with tonnage and grade of reserves known to an exceptional degree of accuracy. Preliminary cost estimates were in excess of the company's ability to finance, thereby eliminating the possibility of simultaneously returning both lodes to production.

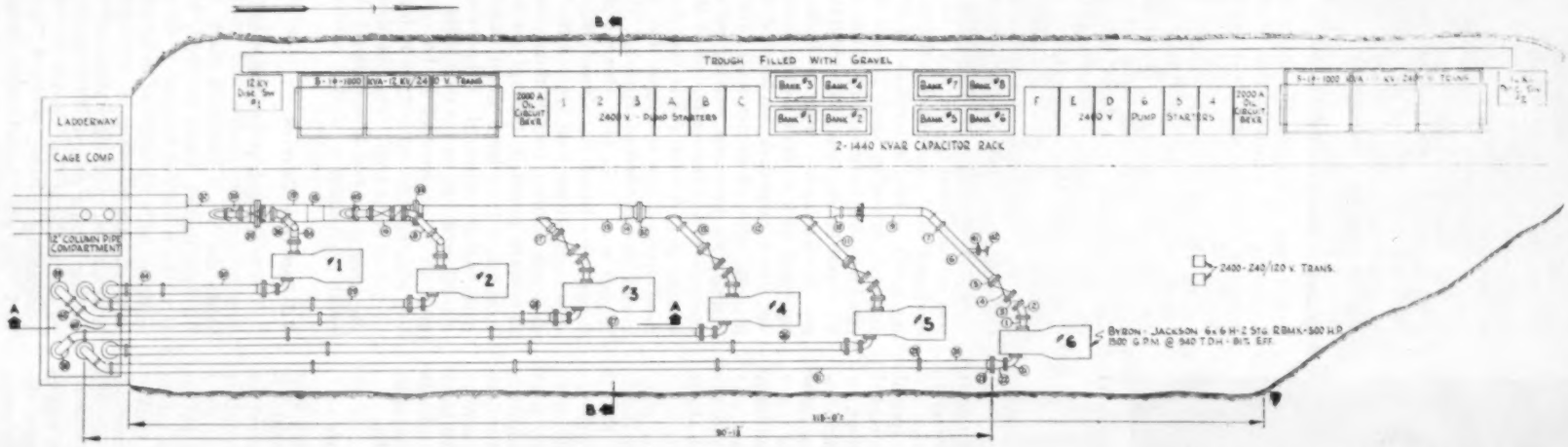
Ingenious Sampling Method

During the period of indecision, additional work was done to determine the analyses and characteristics of the mine water. This information was added to the data obtained during the 1937 to 1939 pumping period.

To obtain a sample of the mine water at different depths, Calumet engineers designed a sampler which consists of a boiler tube four inches in diameter and five feet long. The bottom end is threaded to admit a plug holding a disc fuse designed to rupture at a predetermined pressure corresponding to a certain depth of submergence. A check valve serves to keep the water in the sampler after the disc has ruptured. Two samplers were used in tandem in order to get two samples from each lowering.

To remove the gases contained in solution in the water sample, a hose equipped with a syringe and connected on one end to a stoppered bottle is used. The free end of this hose is connected to an outlet closed by a valve in the top of the sampler. The valve is then opened and the gas, which was held in the water under pressure, is drawn off. To aid in removing the gas, the sampler is given a sharp blow with a hammer. This produces an action similar to that obtained when shaking a bottle of soda water.

Samples of the mine water were taken at various depths through the old No. 5 Tamarack shaft. The 5,308-feet-deep Tamarack shaft (presently the deepest vertical shaft in the United States) intersects the Conglomerate Lode at 4,657 feet. The Conglomerate, in turn, is connected to the Osceola Lode. The sampler was raised and lowered by means of a small truck-


TROUGH FILLED WITH GRAVEL
LADDERWAY
CAGE COMP.
12" COLUMN PIPE COMPARTMENT
2-1440 KVAR CAPACITOR RACK
2400-240/120 V. TRANS.
BYRON-JACKSON 6x6 H-2 Stg. RBMX-500 H.P. 1500 G.P.M. @ 940 T.D.H. - 81% Eff.
SECTION A-A
SECTION B-B

Pumps and Electrical Equipment In 1,077 Station Tamarack No. 5 Shaft

Osceola Lode Unwatering, Calumet Division, Calumet & Hecla, Inc., Calumet, Michigan

Diagram No.	Part Description	Number Required
1	8"x6" reducers—600# flanged	6
2	8"-45° flanged elbows—60#	4
3	8"-check valves—600#	6
4	8"Nordstrom plug valves—600#	6
5	8"-welding neck flanges—600#	10
6	*8"-std. wt. pipe—6'-11½" long	1
7	8"-Victaulic couplings	14
8	*8"-std. wt. pipe—2'-1⅜" long	1
9	8"-std. wt. pipe—5'-10¾" long	1
10	14"x8" reducer-welding y.H	1
11	*8"-std. wt. pipe—4'-10" long	1
12	14"-extra heavy pipe—20'-2" long (½" th.)	1
13	*8"-std. wt. pipe—2'-8⅛" long	1
14	18"x14" reducer—welding X.H.	1
15	18" pipe ½" th.—20'-5⅝" long	1
16	18" pipe ½" th.—8'-7¼" long	1
17	*8"-std. wt. pipe—0'-7⅛" long	1
18	20"x18" reducer—welding X.H.	1
19	20" pipe ½" th.—4'-3-15/16" long	1
20	20"-welding neck flange—600#	2
21	6"-90° flanged elbows—600#	6
22	10"x6"-eccentric reducer-flanged—600#	6
23	10"-welding neck flanges—600#	6
24	10"-std. wt. pipe—length to suit	1
25	10"-Victaulic couplings	20
26	10"-std. wt. pipe—length to suit	1
27	10"-std. wt. pipe—length to suit	1
28	10"-std. wt. pipe—length to suit	1
30	*10"-std. wt. pipe—10'-0" long	1
31	10"-std. wt. pipe—random length	12
32	14"-welding neck flanges—400#	2
33	18"-welding neck flanges—400#	2
34	8"-std. wt. l.r. 90° elbow	2
35	8"-std. wt. l.r. 45° elbow	4
36	8"-std. wt. l.r. 90° elbow	2
37	20"-discharge manifold	1
38	10"-90° std. wt. elbow	6
39	10"-welding neck flange—600#	6
40	10"-45° elbow assembly	1
41	4"-welding neck flanges—400#	2
42	4"-A.C.F. plug valve—500#	1
43	10"-std. wt. pipe—1'-4⅜" long	1
44	10"-std. wt. pipe—length to suit	1
45	8"-std. wt. pipe—0'-8-13/16	2

* Vitaulic groove on one end

APPLYING HEAT CURING NEOPRENE to the interior of the 9⅝-inch casing to protect it against the corrosive mine water. A thickness of from 0.06 to 0.0625 of an inch is used. Neoprene is also applied to the outside by means of a brush.

mounted hoist. Hoisting rope used was one-quarter inch airplane wire rope because ordinary wire rope would have a tendency to twist and unravel.

Explosive Gases Present

Samples taken from the No. 5 Tamarack shaft showed highly explosive gases were entrapped in solution under pressure in the water.

This presented a very serious problem. As pumping would progress, the depth of the water column holding the gases under pressure would be decreased, liberating the dangerous gases. It is believed that these gases were caused by decaying mine timbers during the period that the lodes were abandoned and allowed to fill with water.

Submersible Pumps Dictated

Calumet Division engineers decided that the gas could be held in solution in the water and the two pumped together from the mine using submersible pumps and a continuous air-tight discharge line extending from the pumps to the point of discharge on the surface. It was calculated that as the water level was lowered fresh inflow-water having a specific gravity less than that of the old mine water and not containing any dangerous gases would maintain a surface layer, or blanket seal, over the gas-laden water. This would prevent the explosive gases from escaping into the mine workings.

Pumps of Monel and Bronze

Sampling of the mine water also disclosed a very high chloride content, as shown in the accompanying table. It was impossible to get an accurate example of the extreme amount of corrosion produced by these chlorides, but it was soon determined that using pumps and discharge pipe of common construction would be out of the question.

To combat this obstacle special pumps were designed and constructed using monel (nickel-copper-alloy), or bronze for all parts coming into contact with the water. Discharge pipe that would resist the corrosive water was also needed and is discussed later.

Preliminary plans were to pump through the No. 6 Osceola and the No. 13 shaft. These inclined shafts sunk on the Osceola Lode were to be used for future mining. This plan, however, met with two main disadvantages: first, because the No. 6 Osceola and the No. 13 shafts were inclined shafts, it would be difficult to lower submersible pumps to any great depth; second, installing pumps in these shafts would hamper rehabilitation work and take up valuable room needed for hoisting when the workings had been unwatered enough to begin mining. It was thus decided to pump from the No. 5 Tamarack shaft.

Borrowed Oil Field Methods

A problem then arose as how best to lower the submersible pumps. It was decided to observe the practices used by oil companies which regularly handle long strings of pipe at great depths. R. R. Spencer, mechanical engineer, and T. H. Rapson, area master mechanic, visited oil fields in California studying equipment and methods used to see if they could be adapted to their own problems.

One of the main objectives was to find pipe which would support the large weight of the submersible pump and discharge pipe. As an example, the pump and 1,200 feet of 9⅝-inch pipe full of water would weigh 112,000 pounds when pumping against a 11,000 foot head. It was determined to use 9⅝-inch, (outside diameter) spang extreme lined casing (common oil well casing, which has threads rated at 875,000 pounds pull out). This casing also has the very important advantage in that the threads seal themselves against corrosion.

Casing is Neoprened

A means of coating the inside of the casing with a material that would resist the corrosive water was necessary.

First the use of a thin coating of natural rubber was considered, but decided against because of its inability to resist oil and grease. Instead, heat curing neoprene, (synthetic rubber) supplied by the Gates Engineering Co. of Wilmington, Delaware, was used to overcome this disadvantage. Three coats were applied to the interior of the casing, building up a thickness from 0.06 to 0.0625 of an inch. This was accomplished by building a rack equipped with rollers so that the casing could be held at an angle of 45° and easily turned by hand. The accelerated neoprene at room temperature of 75 to 80° F. was then poured into the top of the casing from a bucket, equipped with a spout, as the casing was slowly rotated. A thin layer of the material adhered to the walls of the casing with the excess running out of the pipe into a bucket placed at the bottom end. After the first coat had been applied, the neoprene was allowed to set before applying the second coat. This took about eight hours, after which the above process was repeated until the desired thickness was built-up. Usually three pourings were required. Curing was accomplished in a large steam heated oven. The regulated temperature started at 80° F. with a slow build to 200° F. in a period of 12 hours. It was then held at 200 to 220° F. for a period of eight hours. The outside of the casing was also neoprened by brush application.

75-Ton Guy Derrick

The next question was how to lower the submersible pumps and casing down the No. 5 Tamarack shaft. An oil field derrick could be used, but this was ruled out because it would interfere with a headframe to be constructed later for use in excavating an underground pumping station and installing booster pumps. It was decided to use a 75-ton Guy derrick (see accompanying drawing of No. 5 Tamarack surface installations) which would not interfere.

P. H. OSTLENDER
Administrative engineer,
Osceola Project

R. R. SPENCER
Mechanical engineer,
Osceola Project

T. W. KNIGHT
Construction engineer,
Osceola Project

C. A. CAMPBELL
Mine manager,
Calumet Division

A. W. HILL
Electrical superintendent,
Calumet Division

A. J. KLEVEN
Electrical engineer,
Osceola Project

O. ARCHAMBEAULT
Head mine captain,
Osceola Project

T. H. RAPSON
Master mechanic,
Calumet area

The Guy derrick also has other advantages over an oil field derrick in that it can easily be positioned over any one of the three compartments of the shaft because it has a ball and socket type mounting, enabling it to be moved in a horizontal circle, while the derrick arm can be moved up or down. This derrick could also be used to pick up pumps or pipe, something that could not be done with an oil field derrick.

To install this derrick, the socket was anchored in a foundation of reinforced concrete designed to withstand a load of 125 tons. Constructing this support, measuring four feet deep and 12 feet in length and width, required 24 cubic yards of concrete. For use with the derrick, a gasoline engine-powered hoist having a line pull of 18,000 pounds was installed. The 75-ton travelling block has a 10 line reeving which increases the actual capacity of the hoist as it is used to 90 tons.

Test Pumping is Done

Before making the final plans for purchasing all of the equipment needed for dewatering, it was decided, as a safety measure, to do some test pumping from the No. 5 Tamarack shaft. This was to make sure that cave-ins had not dammed off sections of the mine workings that were to be unwatered. For this purpose, a Byron Jackson five-stage submersible pump with a capacity of 3,000 gallons per minute at a 500-foot head and driven with a 450-horsepower motor was used.

In lowering the pump the motor was first picked up with the derrick and suspended part way through an opening in the platform over the shaft. It was held in this manner with "U" plates while the pump was lifted with the derrick, positioned and bolted to the motor. The power cable was then connected to the pump motor. The motor is oil filled and needs no further oil supply. The submersible cable is of marine type construction for carrying the 2,300-volt, 3-phase current to operate the motor.

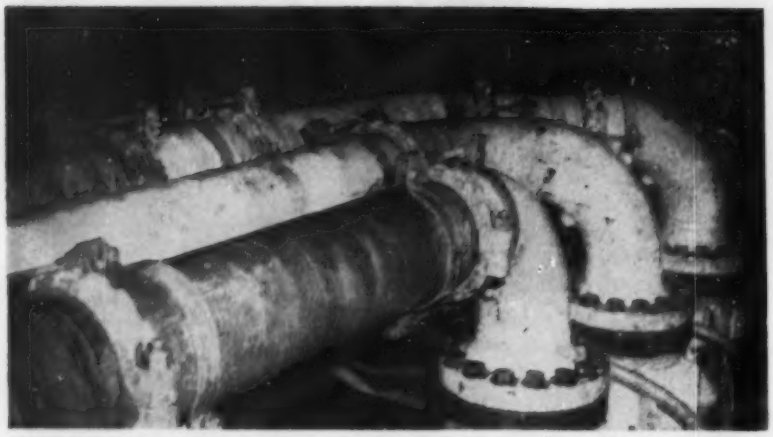
A section, 20 feet, of neoprened casing was then screwed into the discharged end of the pump and the entire unit lowered until about two feet of casing protruded above the platform. It was held in this position by a spider and slips (oil field tools) while the derrick was swung out to pick up another section of the casing, then swung back and lowered.

After the threads on the length of casing were started by hand, the derrick hoist was used to tighten the joints. The slips were pulled and the pump and discharge pipe lowered; slips were then reset and the above procedure repeated. As the pump was lowered the power cable was unreeled and fastened to the outside of the casing with clamps constructed of monel.

After the pump had been lowered to the desired setting 500 feet below the collar of the shaft, it was supported at the collar by a flange screwed onto the top length of pipe. This flange rested on two "I" beams extending across the concrete collar of the shaft constructed to support a weight of 500 tons. The pipe was then connected to a 30-inch concrete discharge line. This pipe was laid two to three feet underground using four-foot lengths, and extending for a distance of 2,400 feet to discharge into a 63,000,000-gallon capacity pond. At the end of the concrete discharge pipe is a 90° elbow turned upward, which keeps the pipe full of water at all times. This is a safety measure so that if the inflammable gases liberated from the mine water by the decrease in pressure become ignited, combustion cannot continue down the discharge line to cause a more serious explosion.

Lodes are Interconnected

Pumping began on March 18, 1953, and about 650,000,000 gallons of water were removed with this test pump. During this period, the water drawn down was continually measured in the No. 5 Tamarack shaft from which they were pumping, the No. 6 Osceola and the No. 13 shaft, proving that the two lodes were still interconnected. When pumping first started, the water level receded 150 feet in the No. 5 Tamarack shaft be-



DISCHARGE LINES from the six-submersible pumps suspended 1,050 feet below the 1,077 foot level pumping station were connected to centrifugal booster pumps on this station. Discharge pipe is 9⅝-inch spang extreme lined casing.

fore any change was noticeable at the No. 6 Osceola shaft. This was due to the higher specific gravity of the deep water.

Six Submersible Pumps Used

Six additional submersible pumps were also purchased from Byron Jackson. These were 12-stage units having a capacity of 1,500 gallons per minute at a head of 900 feet (1,000 GPM @ 1,100 foot head) and each driven with a 450-horsepower motor.

The first pump setting (position to which the pump is lowered) using all six pumps was 1,250 feet below the shaft collar. This was the deepest setting ever attempted with submersible pumps. Each pump and string of discharge pipe weighed 72,000 pounds, the pump and motor itself weighing 10,000 pounds. Pumps and casing were lowered one at a time in the same manner as that used in handling the test pump. Three pumps were hung in each of two shaft compartments in the same way as the test pump. Discharge lines were connected at the surface to a manifold attached to the 30-inch concrete pipe.

Since each pump string weighed 72,000 pounds plus 40,000 pounds of water load when pumping at maximum depth, a shaft collar structure and spanning beams had to be built and installed to carry 672,000 pounds of suspended weight. Actually, the concrete shaft collar structure was designed to carry 500 tons.

Overflow from the reservoir enters a small stream and flows a distance of about seven miles before discharging into Lake Superior. Sampling of the lake water is a continuing procedure to make sure that the mine water does not contaminate the drinking water supply of Calumet and other nearby towns. Due to the higher specific gravity of the mine water, it was found that on entering the lake it flowed along the lake bed out into the depths of the lake without impairment to the purity of the domestic water supply.

Pumping Station Excavated

As pumping continued, work began in May, 1953, on construction of a headframe over two of the five compartments of the No. 5 Tamarack shaft—one to be used as a ladderway and the other for a cage.

When the headframe was completed, the mine hoist installed, and the water level in the mine lowered 1,120 feet below the shaft collar, excavation began on an underground pumping station. Here centrifugal pumps were to be installed for use as booster pumps, the discharge from the submersible pumps being relayed to the surface. A room 38 by 140 feet by 12 feet high was excavated at a depth of 1,077 feet below the surface. For hoisting the muck a two-ton car was used, requiring 2,400 trips.

The centrifugal pumps, motors and transformers were lowered to the underground station on a low bed machinery car. A two-way short wave radio system between the hoist and the cage enabled the cage to be spotted at exactly the correct elevation so that moving the heavily loaded car into and from the cage was made easier.

Booster Pumps Installed

Six Byron Jackson two-stage centrifugal pumps, each rated at 1,500 gallons per minute with a head of 940 feet and driven by 500-horsepower motors, were installed in this station. The six submersible pumps were then lowered 1,050 feet below the pumping station, and supported from this station in the same way that they were on the surface. To lower the submersible pumps this additional distance, 3½-inch oil well drill pipe having a pull-out strength of 272,000 pounds was connected to the 9⅝-inch casing and lowered from the surface by the Guy derrick. One pump was lowered at a time using the 3½-inch drill pipe over again for each pump.

Each submersible pump now discharges to a centrifugal pump, which, in turn, discharges into a manifold from which two-12-inch pipe columns carry the water up one compartment of the shaft to the manifold on the surface. The 12-inch discharge pipes leading from the centrifugal pumps to the surface rest on a concrete foundation in the underground pumping station and are supported throughout the length of the shaft by means of two clamps per 40 foot length of pipe, holding the pipe to the shaft timbering.

12,000 Volts go Underground

To provide power for both the centrifugal and the submersible pumps at this deeper setting, the electrical engineers decided that it would be more advantageous to take the power to the underground pumping station at 12,000 volts and then reduce it to 2,300 volts at the underground station. This is the highest voltage ever taken underground with a single cable.

In order to accomplish this a special cable 4⅝ inches in diameter was constructed by the Okonite Company. This cable consists of three conductors, each conductor 350,000 circular mils in diameter and composed of 61 strands of copper wire. Surrounding each individual strand is a lead alloy protective coating. Around each of the conductors is a covering of semi-conducting tape. Over the tape is a 27/64-inch "Okolite" insulation, consisting of an oil base, and over the "Okolite" insulation is a monel shielding tape.

Between each of the conductors is a saturated (asphalt base) jute filler. Around the three conductors and insulation is a layer of tape, and then another layer of jute to act as a cushion for the armor wire. The armor wires are No. 4 BWG (Birmingham wire gage) galvanized iron wire. Each one of these are covered with a 3/64-inch layer of "Okoprene" (a neoprene formula protective covering).

Overall length of this cable is 1,400 feet and it weighs 16.5 pounds per foot, representing a total weight of 23,100 pounds.

The cable leads from a transformer station on the surface to a transformer

PUMP STATION on the 1,077 foot level. Here six-two-stage-centrifugal booster pumps forced the water on to the surface.

in the underground pump room. The weight of the cable presented a problem in how to support it in the shaft. The electrical engineers solved this by designing a special clamp and supporting the cable by hanging it from only one point, the collar of the shaft. This can best be shown by looking at the accompanying photo. From the underground pumping station power is carried to each submersible pump as it was before—by a separate cable extending down the outside of the discharge pipe.

Future Unwatering Plans

When the water level recedes 250 feet below the 25th level crosscut it will no longer be necessary to lower water in the Conglomerate in order to dewater the Osceola. This point was reached in September 1954. Pumping is now being done from the No. 6 Osceola shaft.

To pump from the No. 6 Osceola, an incline shaft, with submersible pumps produced another problem. Previous to this submersible pumps had only been designed and used for vertical settings.

These submersible pumps have a capacity of 3,000 gallons per minute at a head of 350 feet and are driven by a 350-horsepower motor. First, one submersible was installed at approximately 400 feet below a pumping station located on the No. 24 level. As the water level drops two additional submersible pumps will be installed at about 400-foot intervals. These three submersible pumps, in series, will then discharge to two centrifugal pumps connected in parallel and of the same size and make as those used in the No. 5 Tamarack shaft. The centrifugal pumps act as booster pumps to force the water on to the surface. This method of pumping will continue down to the 48th level, the depth of the shaft. Booster pumping stations each equipped with two centrifugal pumps are now installed at the 11th and 24th levels and as the water level drops another station will be located on the 36th level. Unwatering to the 48th level is expected to be completed by the middle of 1955.

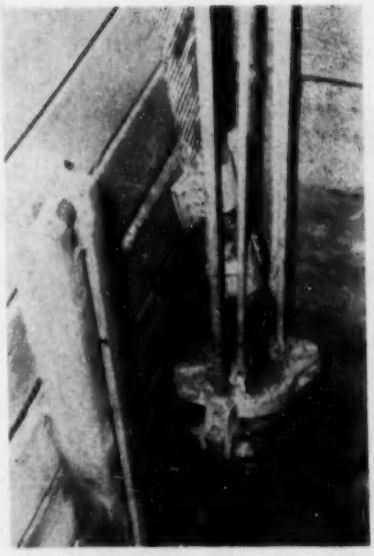
How Equipment Performed

To date all of the equipment selected and methods used have proven satisfactory. Examinations of the pumps and casing has shown that the special construction features of the pumps and the neoprened casing are resisting the corrosive water.

At the end of August, 1954, the water level in the No. 5 Tamarack shaft was at a depth of 1,500 feet. To bring the water to this level 4,800,000,000 gallons had been pumped. This represents 65 percent of the total amount to be removed. Pumping is continuing at an average rate of 9,000 gallons per minute, 2,000 of which is estimated as inflow.

Mining Plans

Two identical headframes have been constructed over the old No. 13 and No. 6 Osceola shaft. The headframes and surface buildings are of the latest design and construction know-how. Design was by the Calumet Division engineers with construction contracts being awarded to the O. W. Walvoord Company of Denver, Colorado. The Wisconsin Bridge & Iron Company of Milwaukee, Wisconsin was given the contract for erection of all steel. The Vern E. Alden Company of Chicago, Illinois, were employed as consulting electrical engineers.



POWER CABLE carrying 12,000 volts and weighing 23,100 pounds suspended from the collar of the No. 5 Tamarack.

Production from each shaft will be at the rate of 1,500 tons per day. Open stope, random pillar mining will be done. Drilling will be with lightweight air leg machines. Slushers will load the broken ore directly into cars trammed with battery locomotives. Some small production is expected this year from the No. 13 shaft.

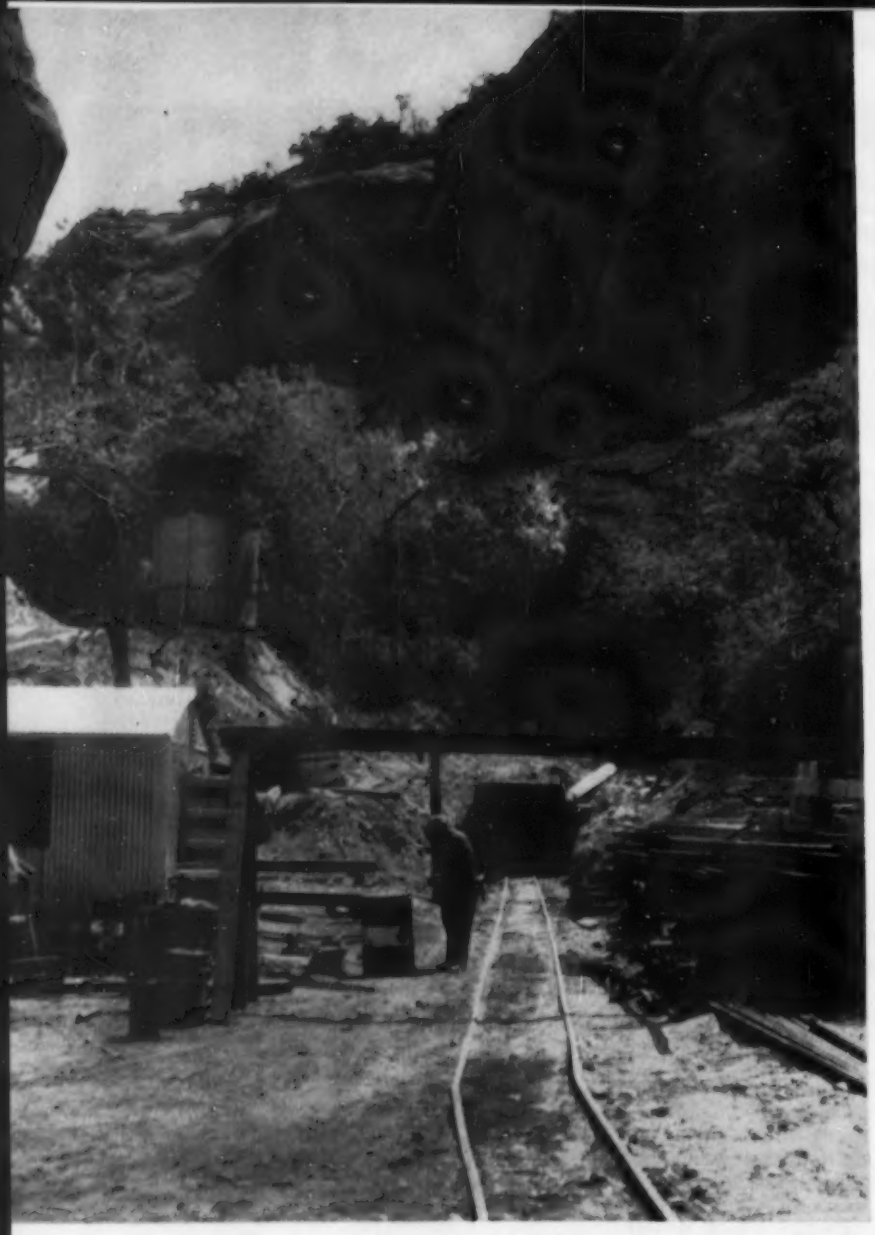
The methods and manner in which Calumet Division engineers have conquered the obstacles encountered in unwatering the Osceola represent an operation of which they can be truly proud.

MINING WORLD is honored to present this story and in doing so wishes to express its sincere thanks to members of the Calumet Division staff who cooperated so willingly in making this story possible.

Analyses and Data on Mine Water Samples Taken From Tamarack No. 5 Shaft
Calumet Division, Calumet & Hecla Inc., Calumet, Michigan

Sample Depth Feet‡	Specific Gravity	pH	Total Solids P.P.M.	Calcium Chloride P.P.M.	Calcium Chloride Percent	Magnesium Chloride P.P.M.	Magnesium Chloride Percent	Sodium Chloride P.P.M.	Sodium Chloride Percent	Total Chloride Ion P.P.M.	SiO_2 P.P.M.	Gas Percent of Water Volume
240	0.998	7.85	644	481	0.05	109	0.011	0	0.0	301	21	
1,630	1.002	6.85	4291	1970	0.12	138	0.014	509	0.051	1667	21	5.4‡‡
												7.0†
3,210	1.048	5.95	65,760	61,720	6.17	239	0.024	3,300	0.33	41,600	19	6.0††
4,140	1.052	5.90	66,100	52,400	5.24	287	0.029	13,360	1.34	41,770	562	3.0‡‡
4,800	1.082	5.60	96,500	73,600	7.36	697	0.070	28,850	2.89	64,920	74	6.7†
5,130	1.055	6.05	66,500	52,800	5.28	286	0.029	11,325	1.13	40,810	40	
5,200	1.080	7.10	101,009	80,610	8.06	714	0.071	19,315	1.93	63,746	63	

‡ Water temperatures: 1,700 feet-62.5° F, 4,300 feet-83.0° F, 5,130 feet-91.0° F.
‡‡ Average analysis of gas collected in evacuated sampler and excluding air components: CH_4—89.0%, H_2—9.0%, CO_2—2.0%.
† Average analysis of gas collected in sampler originally filled with air and excluding air components: CH_4—82.4%, H_2—11.3%, CO_2—6.3%.



• *By driving 3,400-foot Little Beaver adit and sinking 600-foot vertical La Sal shaft*

Homestake Develops Two New Utah Uranium Mines

Homestake Mining Company, largest gold mining company in the United States has diversified its interests and expanded operations to include uranium. Already the largest uranium miner in Wyoming the company will be producing from its two Utah mines in the near future.

The potentialities of uranium were early evident to Homestake's management, largely because Dr. Donald H. McLaughlin, company president, served as chairman of the United States Atomic Energy Commission's Committee on Raw Materials.

Today profitable open-pit mining operations are being carried out on a small ore body only a few tens of miles northwest of Lead, South Dakota where Homestake has operated its gold mine for 76 years. This northern Black Hills ore body was found by Homestake geologists making an airborne reconnaissance survey in the spring of 1952.

Develop Two Utah Mines

With experience gained at this operation Homestake has recently expanded its exploration and development program to the Colorado Plateau. Now Homestake has two important mine developments underway in the Big Indian district of San Juan County, Utah. This is the area where Charles Steen discovered the Mi Vida ore body in 1952 and started the greatest mining rush of the last 40 years.

Initial discoveries of ore on the properties now controlled by Homestake were made by other companies drilling from the surface. Based on these initial drilling results, plus a geological appraisal, Homestake gained control of two claim groups through purchase and options. The first, Little Beaver Mining Company, Inc. a Utah corporation owning claims southwest of the Utex Exploration Company (Steen's original discovery) was acquired early in 1954. The second property, known as the La Sal Mining and Development Company, is some four miles north and was acquired a short time later.

The drilling programs underway at the properties were expanded under the direction of Dr. Paul C. Henshaw, exploration geologist, with results so successful that plans were formulated to first develop the Little Beaver and place it in production as soon as possible.

Don Delicate is mine superintendent. He is a graduate of the University of Minnesota.

LITTLE BEAVER PORTAL is pictured at the top of this page. This is the adit where Homestake cut the uranium ore horizon at the base of the Chinle formation on October 8th.

The Little Beaver ore horizon is at an average depth of 600 feet below the surface at the base of the westerly dipping Chinle formation. At the surface the claims are staked in an area of extremely rough terrain with steep canyon walls. To the east is the steep escarpment formed by erosion of the crest of the Lisbon Valley anticline, to the west is a general dip slope formed by resistant Wingate sandstone strata. Fortunately, this dip slope is bisected by a series of nearly parallel east-west canyons which at their heads cut through the Wingate to expose the Chinle. The most prominent of these canyons is Steen's Canyon—site of the Mi Vida mine.

Adit At Little Beaver

Location, therefore, offered two approaches to underground development and mining. The first would be by a vertical shaft and the second through a long adit from the flank of the anticline. Homestake chose the adit development because of the difficulties imposed by topography in road building and site preparation for a shaft. Also, an adit, of course, affords lower cost production facilities than does a shaft.

The site selected for the adit portal was in a small canyon branching south of Steen's Canyon. From this point a 3,400-foot-long adit with a plus 0.25 percent grade could be driven to intersect the Chinle ore bed about the midpoint dipwise in the Little Beaver ground. Surface diamond drilling so far has been largely up dip from the point where the adit could pierce the ore horizon so mining conditions for the ore as indicated to date would be favorable.

The necessary dump and right of way permits were secured and a contract to drive the adit was awarded to the Centennial Development Company of Eureka, Utah. Centennial established a surface plant, an employees' trailer village, and on March 15 portaled the 7- by 8-foot adit at the base of a high sandstone cliff.

In the adit Wingate sandstone is traversed for the first 200 feet with the remainder in Chinle beds.

Drive 3,400 Feet

The adit has been advanced on a three-shift basis with 3,200 feet being driven by September 21. In June, 595 feet were driven for the highest monthly footage. The ore horizon was cut early in October. Homestake took over mine development soon after ore was encountered.

In driving the adit two Cleveland AirLegs with tungsten-tipped Coromant steel have been used for drilling. A round of 24 holes is loaded with

SURFACE PLANT at Homestake's La Sal uranium shaft looking southwest. From left to right are the office and change room, headframe, timber pile, hoist house, shop, and power plant and compressor building.

LA SAL SHAFT is a three-compartment vertical shaft started by Homestake in late July and will reach planned depth of 600 feet by mid-November. It is the deepest shaft in the Big Indian uranium district of Utah.

DOUBLE DRUM hoist at the La Sal shaft is driven by a 100-horsepower electric motor. Non-twist ⅝-inch wire rope is used for hoisting. The new Stran-Steel building is covered by corrugated iron.

Gold Medal powder and fired with electric caps. Broken rock is loaded into two-ton Granby side-dump cars with an Eimco 21 B RockerShovel. A slab round is shot every 200 feet which gives room for switching of empty cars with a Canton car transfer. Tramming is done with a GMC Diesel-powered locomotive built by the Cate Equipment Company.

The normal cycle is two rounds for each of the first two shifts and one round for the third with the remaining time on this shift used for track and pipe installation. Exhaust ventilation through a 20-inch vent pipe quickly clears the smoke after each round.

Roof Bolts And Gunite

Installation of C.F.&I. roof bolts has made timbering unnecessary. These bolts average one per foot of advance and are placed in a staggered pattern across the back. Some trouble has been encountered by air slaking of the mudstone and siltstone members of the Chinle. To prevent this the sides and back of the first 1,500 feet of the adit have been gunited to form an air seal. A special plant prepared sand-cement mix of Sakcrete and Shotcrete is used for the gunite.

Guniting has been successful and in only a few places have small cracks developed or peeling of the gunite taken place. Some difficulty has been encountered in ballasting the track. When water gets into the fragments of the Chinle in the bottom of the adit a thin mud soon results which affords neither support nor stability to the track. When full-scale mining starts, it may be necessary to bring ballasting material into the wetter sections of the adit.

After the adit is completed, inclined raises, in the ore bed, will be driven into and through the ore body. From these raises open stoping with jackleg drilling is contemplated. Air-driven slushers will be used in the stopes. Off-track mechanization using Dieselized equipment does not appear possible because of the relative thinness of the ore. Initially stope ventilation will be through bore holes. Homestake is purchasing new main line haulage equipment consisting of a Mancha Diesel motor and Coeur d'Alene Foundry rocker dump cars.

Sink Shaft At La Sal

The second property in the district that Homestake is developing is known as the La Sal after the company that discovered ore, also in the base of the Chinle, by drilling from the surface. Topography dictated sinking of a vertical shaft to reach the ore horizon. Accordingly, a site was selected where the shaft bottom would be downdip from the ore bodies to facilitate mining. A cross cut will be driven from the shaft to the ore horizon and a haulage level in and along the ore bed. A series of inclined raises (plus 10°) will be driven to the upper limits of the ore. Open stope and pillar mining will be used and in the thinner sections, or where inter-tonguing waste is present, resuing will be used.

All slushing will be with electric slushers which will be possible at this mine because two Diesel-electric power generations plants have been installed.

The vertical shaft will be 600 feet deep, and will have a 7-foot 4-inch by 17-foot 4-inch rock section and three

MAIN STREET of Homestake's Big Indian camp. Because of the isolated area, housing must be furnished for employees and their families. Married men live in the trailers, while single men live in a new bunk house.

MINE SUPERINTENDENT Don Delicate is a graduate of the University of Minnesota and worked at Lead.

equal sized compartments. A slusher pocket will be excavated for storage of ore and waste and used for skip loading.

The shaft is being timbered with 8- by 8-inch Oregon fir sets on six foot centers and laced with 2-inch Red pine. Blocking and wedges are native timber. All wedges have been given a Cuprinol treatment.

Riddell Mucker Speeds Sinking

The shaft bottom is drilled with Gardner-Denver sinkers using tungsten-tipped chisel bits and Coromant steel. A Riddell mucker is used for loading the 35-cubic-foot sinking buckets. The sinking schedule calls for one complete set, or more, per 24 hours—drilling, blasting, mucking, and timbering. Target date for shaft completion is November 10, 1954. On August 1 the shaft was 45 feet deep with equipment installations still being made and the training of the crew underway. Centennial development is the shaft contractor.

A two-stage, Joy, 15-horsepower Axivane fan set adjacent to the collar blows air down a 20-inch vent line in the manway compartment.

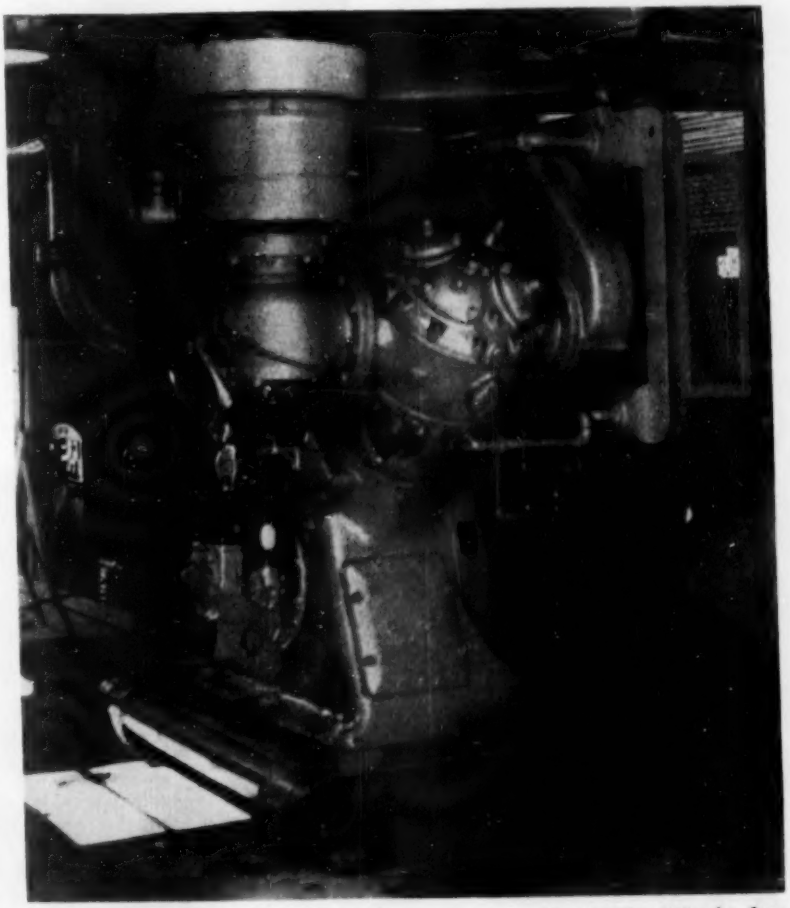
Four new Stran Steel buildings with concrete floors have been erected. The 20- by 40-foot compressor and electric generator building houses two GMC Diesel-electric generators. One is a 60-kw unit which operates 24 hours a day to supply electricity for the camp. The larger, 175-kw unit supplies current for the hoist and surface installations. Compressed air is furnished by a Joy 660-cubic-foot, semi-stationary compressor driven by a Caterpillar D 13000 Diesel. A 10,000 gallon Diesel oil storage tank permits tank lot purchases with an appreciable saving in cost.

New Mine Plant And Camp

The hoist building, 16 by 32 feet in size, houses a double drum hoist driven by a 100-horsepower motor. Non-twist ¾-inch wire rope is used for hoisting. The shop building where normal mine repairs can be made is 16 by 24 feet. The combination dry-office-warehouse building is 20 by 50 feet. Water for showers is trucked to a storage tank on the hillside above the buildings.

Because of the isolated location Homestake has built and equipped a trailer village. Separate central toilet facilities are provided for men and women. Single men live in the bunkhouse and eat in the company-operated mess hall. The camp is equipped with electricity and running water. The electricity is brought over a pole line from the La Sal shaft and water is pumped from a diamond drill hole.

GMC DIESEL'S furnish all power used at the Little Beaver adit. The unit in the foreground drives an electric generating set while the one in the background powers a compressor for mine air supply.



COMPRESSED AIR for the La Sal shaft operation is supplied by this 660-cubic-foot, Joy, semi-stationary unit driven by a Caterpillar D 13000 Diesel. Diesel-electric generator is visible in background.

DRILL MASTS tower over crowds in San Francisco's Civic Center attending the 1954 Mining Show and Machinery Exhibit.

Interest Centers on Uranium and New Equipment at AMC Mining Show

Uranium made the Metal and Nonmetallic Mining Show in San Francisco, California from September 20 through the 24th the best attended in history. Exploration, mining, and metallurgical equipment for all types of both underground and surface mining was on display inside the main Auditorium building and overflowed into the Civic Center. Here, too, the emphasis was on uranium with a large number of radiation detection and counting instruments demonstrated by many electronics firms. A notable feature of the exploration equipment was the large number of portable (truck-mounted) drilling rigs displayed for the first time at a Metal Show.

While uranium attracted the greatest spectator interest from the "man on the street" as well as the "get rich stock speculator," large crowds also attended the political and technical sessions. Operators and their technical staffs were keen to find out what was new in classification, how new jumbos and bits could cut drilling costs, and what shovel could load more tons per shift at lower costs.

Howard I. Young, president, American Zinc Lead, and Smelting Company, and also president of the Mining Congress, opened the show by pledging the full support and all-out cooperation of the mining industry as he said "Metals mean the real foundation of National Defense. The industry is doing its best at all times to keep healthy to meet any emergency."

Frank R. Milliken, vice president, Kennecott Copper Corporation, and chairman of the program committee for the show thanked what he called ". . . the capability of the outstanding speakers at the meeting which assured its success."

Metals Outlook

It is only natural to wonder what lies ahead and the mining industry certainly is no exeception. Accordingly, the special session on *Outlook For The Mineral Industries* was of paramount interest to all.

Simon D. Strauss, vice president and sales manager of the American Smelting and Refining Company, showed how lead, zinc, and copper consumption in the United States has not kept pace with over-all industrial activity as measured by the Federal Reserve Board Index. He saw the best answer to the present over production of base metals a program to increase their demand and use.

For nonmetallic minerals "markets are generally firm, demand for next six months will be firm to easing, and supplies generally will be more than adequate" was the report of Richard J. Lund, Battelle Memorial Institute. He added that "excess domestic capacity is a modest threat to potash, rare earths, and perlite; and excessive imports are troubling fluorspar, potash, and possibly rare earths."

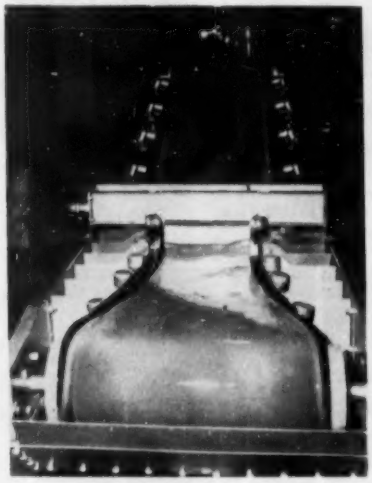
"The outlook for the strategic minerals (tungsten, manganese, chrome, mica, beryl, asbestos, columbite-tantalite) in the United States is encouraging and will continue favorably as long as the present programs are in effect" was reported by Charles H. Segerstrom Jr., president, Nevada-Massachusetts Company.

Further expansion projects by the producers of aluminum and magnesium are ahead, according to Lawrence Litchfield, Jr., general manager of Aluminum Company of America's mining division. He added, "Aluminum and magnesium comprise one of the most dynamic and promising segments of the metals industries today."

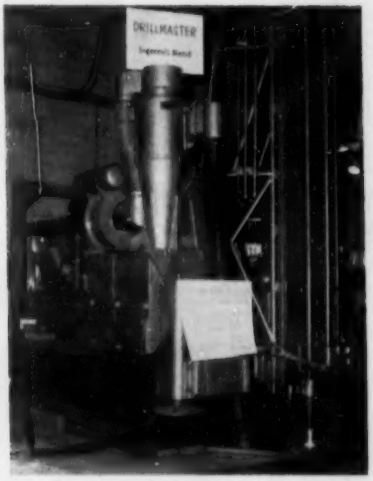
Mining Show previews the industry's latest equipment . . .

EUCLID'S NEW SCRAPER, the S-18, is an 18 cubic yard overhung machine. It has a 300 horsepower GMC Diesel engine with an Allison torqmatic converter and transmission to permit shifting under full power.

CUMMINS NEW DIESEL FUEL system now standard on all models was displayed to illustrate its simplicity.

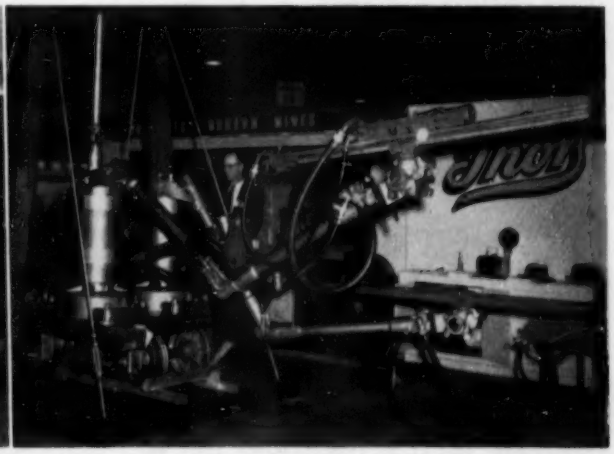


DENVER-FINNEY CLASSIFIER is a submerged belt classifier. First units have been tested by Climax Molybdenum.



DRILLMASTER just introduced by Ingersoll-Rand is a complete self-contained unit for rotary or percussion drilling.

JOY'S NEW RUBBER TIRED two machine jumbo has air actuated booms which are controlled from a centralized operation panel.



NEW THOR ENGINEERED JUMBO features simplified operating controls designed to help speed drilling rounds in tracked drifts.

Mining Men gather

to discuss . . .

. . . and debate

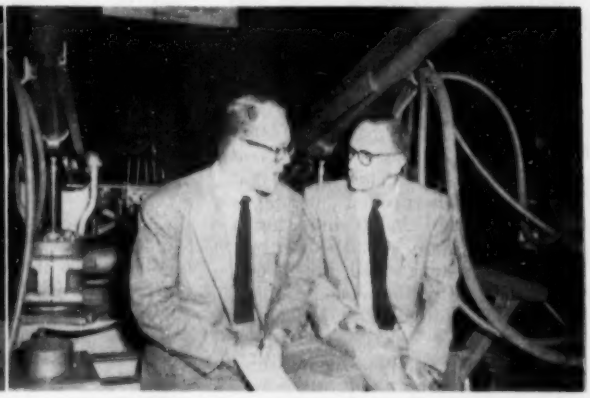
UNDERGROUND MINING PRACTICES were high-lighted in part by: F. Coolbaugh, vice pres., western oper., Climax Molybdenum Co., Climax, Colo.; J. W. Still, gen. supt., Miami Copper Co., Miami, Ariz.; J. F. Buchanan, mine mgr., San Manuel Copper Corp., Tiger, Ariz.; E. B. Olds, foreman, Crescent mine, Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho.

PAPERS ON UNDERGROUND MINING were also presented by: H. B. Ewoldt (left), vice pres. and gen. mgr., White Pine Copper Co., White Pine, Mich.; H. H. Wells, supt., U. S. and Lark mine, U. S. Smelting Refining & Mining Co., Lark, Utah; E. H. Miller, asst. res. mgr., U. S. Potash Co., Carlsbad, New Mex.; G. A. Gordon, gen. mgr., Canadian Exploration Co., Salmo, B. C.; R. Henderson, res. mgr., Climax Molybdenum Co., Climax, Colo.

AFTER SESSIONS small groups gathered to discuss individual operating problems: LEFT: J. A. Jaekel, Met., National Tank & Pipe Co., Portland, Ore; M. K. Hannifan, asst. gen. supt. of mines, Anaconda Copper Mining Co., Butte, Mont.; W. I. Watson, met. engr., Arthur D. Little, Inc., San Francisco, Calif. CENTER: R. B. Taylor, gen. mgr., Mexican oper., The Eagle-Pitcher Co.; Paraal, Chihuahua, Mex. A. I. Rodriguez, consult. engr., San Francisco, Calif.; RIGHT: K. C. Li, chairman, Wah Chang Corp., New York; R. C. Kirchman, mine supt., Lincoln mine, Wah Chang Mining Corp., Tempiute, Nev.

EVERYWHERE ON THE EXHIBIT FLOOR mining and manufacturing men discussed new machinery and renewed old acquaintances: LEFT: B. Wes Vaughan, plant supt., Calif. Portland Cement; P. R. Ehrgott, Baldwin-Lima-Hamilton Corp.; T. A. Griffin, dist. mgr. Calif-Ariz-Nev., Construct. Equip. Div., Baldwin-Lima-Hamilton Corp., Los Angeles, Calif; I. A. Smith, quarry supt., Calif. Portland Cement, Colton, Calif. CENTER: J. A. Turner, mining engr., Jeffery Mfg. Co.; L. F. Merwin, sales rep., The Timken Roller Bearing Co., San Francisco, Calif. RIGHT: R. C. Youtz, tram and quarry supt., U. S. Gypsum Co., Empire, Nev.; M. Yunker, asst. mgr., Indus. Div., Republic Supply Co. of Calif., Los Angeles, Calif.

CROWDS GATHER around the MINING WORLD uranium contest (left) to see who won first prize. In the booth at right are: C. M. Marquardt, electronic engineer, Salt Lake City, and R. T. Laird, consulting geologist from Oxnard, California.



ON THE DISPLAY FLOOR T. A. Griffin, (left) district mgr. for the Baldwin-Lima-Hamilton Corp. and N. A. D'Arcy, Jr., mechanical engr., Huntington Park, Calif., discuss shovels. Sitting on a Gardner-Denver drill jumbo are Lee Biheimer, (left) research engr., Empire Star Mines, Co. Ltd., Grass Valley, Calif. and G. D. Stearns, field engr. for the Gardner-Denver Co.

Technical Reports, Guessing Contests, and Fishing Fun at the Mining Show

Of greatest interest to the delegates attending the Mining Show sponsored by the Western Division of the American Mining Congress in San Francisco on September 20 was one of the keynote speeches. It was a definite report of progress being made by the President's Committee in Washington in developing and establishing a sound national mineral policy. The man who made the report, Honorable Felix E. Wormser, assistant secretary for mineral resources, Department of the Interior, knew what he was talking about because he advises both the Secretary of the Interior (the committee chairman) and the committee itself.

This committee is the President's Committee on Mineral Policy with the secretaries of Interior, State, Commerce, and the director of the Office of Defense Mobilization as members; with the Secretary of the Treasury, and the director of the Bureau of the Budget acting in advisory capacities.

The Committee is making progress, secretary Wormser reported, in that recommendations to the President for the purchase of domestically mined minerals for the long-term stock pile were acted upon favorably. At present steps are being taken to assure an orderly and vigorous development of domestic mineral resources. One of the Committee's problems has been the lack of an adequate appraisal of the nation's mineral resources.

Outlook For Uranium Mining

Jesse C. Johnson, director Division of Raw Materials, United States Atomic Energy Commission, outlined the multi-billion dollar expansion program since 1952 to produce fissionable material. Uranium to feed these plants had to come from new sources.

The uranium has been found, Johnson reported. "In six years, starting with nothing but uncertain prospects, the United States has become one of the world's leading uranium producers. We shall be competing for first place, and part of the time be in first place." As to the markets for this uranium; today it is all for defense with the long term dependent on the use of nuclear fuel for industrial power.

What will the uranium needs be for this type of power generation? Based on each 1,000,000 kilowatts of electric capacity, Johnson made the following estimate:

AT MANUFACTURER'S BOOTHS: Left, J. B. Tierman, Fiske Bros. Refining Co. and E. J. Mackenzie, Simplex Wire & Cable Co. Center, Seen at the E. J. Longyear Co. booth are R. D. Longyear and P. L. Merritt, (Raw Materials Div., AEC) talking to Mrs. Longyear. Right, H. R. Keil, Golden Cycle Corp., and J. McWilliams of the Aluminum Co. of America.

Inventory requirement	600 tons
Annual burn-up replacement at 2.0 percent fissioned	50
Total	650 tons

On a Free World basis, 100,000,000 kilowatts of power appear reasonable near 1980. This means that 5,000 tons will be needed annually as replacement and 9,000 tons for a yearly expansion of 15 percent. Thus a continuing need for 14,000 annual tons was foreseen by Johnson. This is roughly equivalent to 17,000 tons of U_3O_8. He added, "There is no doubt about having sufficient nuclear fuel for the future power industry."

Exploration Drilling Trends

Ray G. Sullivan, vice president and general manager, Minerals Engineering Company of Grand Junction, Colorado, reported that there were now 250 exploration drills operating full time, and 300 part time in the nation's uranium fields. These drills, are making hole at the rate of 3,000,000 plus annual feet. He said that deeper search was increasing with the resultant increase in costs for holes. As an example for a diamond drill hole over 800 feet deep, the average footage per shift was 20 with the cost at $7.00 per foot. By plug bit drilling to the ore horizon, the overall cost per foot could be cut to $3.50 to $4.00.

M. T. KASPER of the Dart Truck Co. placed second in the Derby. He is shown with fish weighing 24, and 30 lbs. 9 ozs.

Tungsten Conference

When will the tungsten stockpile be filled and what will happen to the price of tungsten when it is? These were the two big questions which tungsten mine operators sought the answer to.

The first question was answered by R. W. Geehan of the U.S. Bureau of Mines who gave the following statistics. As of August 1 of this year 1,143,583 short ton units had been purchased by the government. During the third quarter of this year 209,000 units were purchased. Predicting an increase in production the government contract calling for 3,000,000 units would be fulfilled in June 1956.

The second question was answered partially by J. G. Liebert of the Department of Interior. Mr. Liebert said, that a new department was being set up under the Office of Defense Mobilization to plan for a domestic tungsten mining industry to meet security measures. How large a production this would require he did not know.

In the discussion that followed K. C. Li, chairman of the Wah Chang Corporation, said that he thought what was needed most was to convince the government of the amount of domestic tungsten that could be produced and the economics of a United States production. Blair Burwell, president of Minerals Engineering Company, stated, that of the 18,000,000 units of tungsten used during World War II 12,000,000 units were produced by domestic mines. He added that the United States has produced tungsten cheaper than prices paid to foreign countries. Mr. Li supplemented this by saying that just after the Korean War broke out $90.00 to $100.00 a unit was paid for foreign tungsten and that during World War II over $100 was paid, and if a large shipment had not been purchased just prior to this war the United States would have paid at least $1,000 a unit.

Lower Drilling Costs

Harry L. Miller, assistant superintendent of mines of the American Zinc Company of Tennessee, told of the experimenting being done by his company in drilling smaller diameter blast holes, and using Airleg drills in place of column-mounted drills. Stope drilling with column-mounted drills averaged 42.1 feet per machine man shift, breaking 39.85 tons. This was stepped up by using Airlegs to 89.8 feet of hole breaking 67.38 tons, or an increase of 69 percent. Drill steel of ⅞-inch diameter and tungsten carbide bits have replaced 1¾-inch steel and 2¼ steel bits. Further experimenting is now being done using ⅞-inch steel.

D. A. CHEYETTE, Nordberg Mfg. Co. holds aloft a salmon that he just caught. This one is about an 18 pounder.

L. T. Postle, vice president and general manager of Granby Consolidated Mining, Smelting & Power Company, Copper Mountain, British Columbia, described the superiority of percussion drills for long hole drilling over diamond drills. Drills now used are 3½-inch drifters using a 2½-inch tungsten-carbide bit. To prevent whipping action a coupling is placed close to the bit.

Underground Mining

Friction type mine hoists were discussed by Guy N. Bjorge, vice president, Homestake Mining Company, San Francisco, California. He told of the advantages claimed by using this type of hoist and its almost universal use in European mines. Some of these advantages are: increased safety in operation due to more than one rope; less rope wear because of no fleet angle; and there are no layers of rope to rub on each other. The hoist has a lower peak power demand and consumption, and can be mounted in the headframe. The first hoist of this type in the United States is now being installed by The Cleveland-Cliffs Iron Company at Ishpeming, Michigan.

A new Coeur d' Alenes shaft sinking record was recently set by the Bunker Hill & Sullivan Mining & Concentrating Company. E. B. Olds, mine foreman of this company, told how this was accomplished. Some of the contributing factors were: transfer of the broken rock from a sinking bucket to a skip for hoisting most of the distance to the surface; a bonus incentive plan; using drifters mounted on pneumatic columns. Average rate of advance was 8.4 feet per shaft sinking shift. The shaft was deepened 2,000 feet at a cost of $205.20 per foot.

G. W. Colville, assistant general manager and chief engineer for the Bagdad Copper Corporation at Bagdad, Arizona told how Bagdad changed from an underground to an open pit mine.

Combination truck and rail haulage at the Lavender pit, Bisbee, Arizona was the title of a paper presented by C. E. Mills, manager of the Copper Queen Branch Phelps Dodge Corporation. The size and shape of the Lavender ore body made rail haulage within the pit impractical. The nearest area large enough for dumping the estimated 101,000,000 tons of overburden was located 1½ miles from the pit edge. Because of the length of haul and the necessity to remove 60,000 tons of waste daily rail haulage was chosen from the edge of the pit to the dump in preference to truck haulage. The use of this combination truck-rail haulage has since proven to be very satisfactory.

Who Won What At Mining Show

MINING WORLD'S uranium estimation contest was won by R. I. C. Manning. Here's how close the first 10 contestants were grouped:

Percent U_3O_8	Weight In Pounds	Name	Address
0.467	59.5	J. W. Hill	Grand Junction, Colorado
0.467	165.0	A. L. Bush	Grand Junction, Colorado
0.458	98.5	K. N. Meador	San Francisco, California
0.454	152.0	ASSAY AND WEIGHT BY ABBOT A. HANKS, INC. No. 72694	
0.453	150.0	R. I. C. Manning	Phoenix, Arizona (1)
0.453	132.0	Mrs. J. G. Hansen	Eagle Mountain, California (2)
0.453	105.0	J. M. Harerl	Las Vegas, New Mexico
0.450	150.0	Roy Grumbine	San Francisco, California
0.450	200.0	Leon Lebovre	San Francisco, California
0.444	138.0	R. L. Stark	Denver, Colorado
0.444	294.0	G. M. Huck	San Francisco, California

The highest of the 800 estimates was 84,653.216 percent and the lowest 0.00025 for the sample of uranium ore from the Lisbon Valley, Utah mine of the Continental Uranium, Inc.

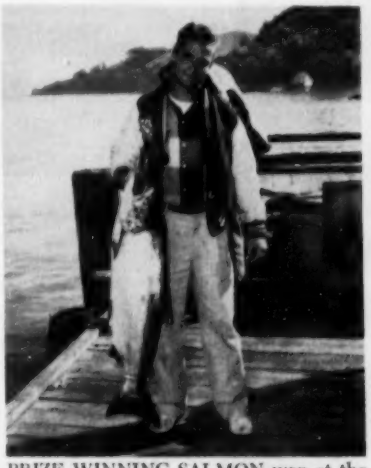
Of the top 10 it is interesting to note that six are mining engineers or geologists. One is an employee of the United States Geological Survey and another is president of a uranium mining company operating in Colorado.

The Allen-Sherman-Hoff Company's contest was won by Frank J. Windolph, assistant mill superintendent of the Climax Molybdenum Company, Climax, Colorado. He guessed 107 which was the exact number of rubber pellets being pumped through a plastic spiral by a Centriseal pump. Other close guessers were: H. S. Pennebacker, San Francisco, California; Alvin F. Kroll, Kellogg, Idaho; and C. J. Solari, San Francisco. The prize was a Heddon fishing rod and Pfleuger Supreme reel.

MINING WORLD'S uranium ore contest winner R. I. C. Manning and the prize of $100.00's worth of Alaskan gold nuggets. He is director of the Arizona Department of Mineral Resources, Phoenix.

CRUCIBLE STEEL'S contest winner Oscar A. Glaeser, vice president and general manager, western operations, United States Smelting, Refining and Mining Company. His guess of $85.00 was closest to actual $84.60.

CATERPILLAR TRACTOR winners who each received a toy tractor model for guessing closest to the number of beans in a fish bowl and their guesses were: Jayne Kravig, Lead, South Dakota (11,276); Ralph Rundberg, Reno, Nevada, and Joe Marshall, San Francisco, California (11,111); Mrs. James E. Smith, Salt Lake City, Utah (11,023); Robert Greenhow, Mill Valley, California (11,021); D. E. Rizor, Marian, Ohio (11,418); and Richard Swartz, Terre Haute, Indiana (11,477). There was a tremendous spread in the guesses—a low of 600 and a high of 429,170,345.



PRIZE WINNING SALMON won at the Salmon Derby off the Golden Gate, 31 pounds 0 ounce, was caught by Stanford University student Sherman Kellar. His home is in Lead, South Dakota where his father Kenneth C. Kellar is legal counsel for the Homestake Mining Company.

WORLD'S LARGEST ASBESTOS MILL at Canadian Johns-Manville's Jefferey mine at Asbestos, Quebec, Canada. An edge of the open pit is visible at upper left and in middle center one of the headframes of the two underground mines. Old mills are at far left. The new mill is 432 feet long and 195 feet high. The 14-story building houses 5.2 miles of rubber belts, 30 miles of electrical conduit, 7.0 miles of chutes, and 4,600 fluorescent lights. Connected horsepower is 15,000.

New Mill Treats 33% Of World's Asbestos

The largest and most efficient asbestos mill in the world has been placed in operation at Asbestos, Quebec, Canada by the Canadian Johns-Manville Company, Ltd. The new mill will treat ore from the largest known asbestos deposit in the world—the Jeffrey mine which produces more than one-third the Free World supply of asbestos fiber.

This new mill will replace the present smaller mills, which are becoming obsolete, and which are located in the caving area of the underground mine. It will provide additional capacity to reach a total annual production of 625,000 tons, and will operate at lower costs.

Constructed of steel and concrete, it is a 14-story building covered with "Transite" sheathing—an asbestos-cement product manufactured by Johns-Manville. The first half of the building is completed and 25 percent of the machinery is installed and in operation. The entire project should be completed by the spring of 1956.

This new plant incorporates the most modern facilities for the milling and production of high quality asbestos fibers—an essential objective in today's competitive asbestos industry. It is the latest project of the Quebec asbestos mining industry which has embarked upon a $70,000,000 program of expansion and development of new mines, mills and machinery. The seven Quebec producers who operate 11 mines are the Asbestos Corporation Ltd.; Bell Asbestos Mines Ltd.; Canadian Johns-Manville Co. Ltd.; Flintkote Mines, Ltd.; Johnson's Company Ltd.; Nicolet Asbestos Mines, Ltd.; and Quebec Asbestos Corporation, Ltd.

Efficient Dust Control

The new mill has 22.5 acres of floor space. When in full production, early in 1956, it will provide additional capacity to reach a total annual production of 625,000 tons of asbestos fiber, with a daily capacity of 60 railroad carloads aggregating 2,500 tons. Adjacent to the famous Jeffrey mine, long known as the largest asbestos mine in the world, the new mill will draw on ore reserves for more than 100 years of operation at the present rate of production.

Equipped with the most modern lighting, safety devices and dust control equipment, the new asbestos mill is expected to provide the safest and healthiest working conditions of any fiber mill in Canada or the United States, company officials said.

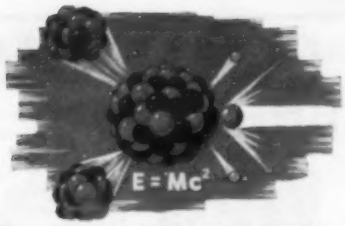
There are 4,000 separate dust enclosures, utilizing four miles of piping and 12 miles of control wiring in the dust control system. It takes 30 acres of cloth to provide bags used in filtering dust as the ore is milled. When in full operation, the new mill will have air handling equipment capable of purifying 2,500,000 cubic feet of air each minute. There are 5,000 separate safety guards on the milling equipment and more than 4,600 fluorescent lighting units.

Asbestos Mining Important

Depending on its grade, a ton of asbestos fibers ranges in value from $1,200.00 for Number One Crude to $35.00 for shorts. The average ton recovered in Quebec sells for about $90.00. Some 75 different grades are produced to meet the varying and special demands of consumers.

In 1953 production of asbestos fiber in Canada amounted to tons at a value of $87,633,124. This was 65 percent of the free world's asbestos production. Of this output, 97 percent was exported, mainly to the United States. The United States, which consumes some 70 percent of the free world's production, gets 70 percent of its supply from Canada. Johns-Manville, alone, produces more than half of the asbestos fiber mined in Canada. The company operates a second asbestos mine and mill near Matheson, Ontario. This is known as the Munro mine, which produces about 25,000 tons of asbestos fiber annually.

In brief, the new mill makes possible more efficient ore treatment resulting in the production of cleaner fibers, more acceptable for certain uses in Johns-Manville plants and consistent with the latest customer specifications.



FISSION FACTS

Monthly Roundup of Mining News In the Atomic Energy Field

Odlum Negotiates For U_3O_8 Concession in Argentina

Floyd Odlum, United States financier and recent purchaser—through Atlas Corporation—of the high-grade Delta uranium mine of Vernon J. Pick in Utah, has been in Argentina negotiating for another uranium project.

Atlas is seeking governmental approval of a plan to conduct a nine-month aerial and ground survey of Argentina for uranium and thorium deposits. After the survey, Atlas would get mining rights for 12 years covering the most promising areas. The government would receive a 25 percent royalty for all ore sold, with income to be earmarked for construction of an atomic-powered electrical plant. Atlas would start plant construction within 10 years or lose all interests in the uranium deposits.

What AEC Act of 1954 Can Mean To Uranium Industry

The basis for the recently enacted Atomic Energy Act of 1954 can well be summarized by these words taken from the Declaration of Policy in Chapter 1, Section 1 as follows: "Make the maximum contribution to the general welfare." There is no doubt as to the sincerity or intent of Congress in passing this law, nor is there any doubt as to the difficulties and interpretations facing the United States Atomic Energy Commission. It will take time to accumulate experience to administer the new law and it also will take time for the issuance of detailed regulations.

Of greatest importance is what the new law can do. First, it opens the way for an unlimited number of potential uranium buyers because under the old law the government was limited as the sole owner of nuclear reactors. Second, the law assures and permits leasing of fissionable material from the government at a fair price. Third, the law makes it possible for private industry to make definite plans for nuclear power programs and commit funds for such with the knowledge that the law is designed to encourage just that. Another major provision is for the Atomic Energy Commission to establish new systems of classification for atomic information which can make it possible for more people to take a more active part in the use of atomic energy at a quicker rate with less cost.

For the miner it means broadening of markets for his ore beyond the military field.

Is Field Uranium Milling Minerals Engineering Goal

Minerals Engineering Company of Grand Junction, Colorado, and the Continental Uranium, Inc., have joined forces to erect and operate a pilot uranium plant at Grand Junction. The new mill will incorporate, for the first time in the uranium recovery field, several patented processes of Blair Burwell, Minerals president. Ray G. Sullivan, vice president and general manager, will supervise the project.

Testing work will be done on ore now being stockpiled from Continental's Lisbon Valley, Utah, mine. The object of the test work is to make it possible to design and build a low-cost, easily portable plant to make a good recovery of primary concentrate at the mine site which then can be shipped to a central refinery. The need for and advantages of such a plant are readily apparent because trucking of ore from Continental's mine to the Climax Uranium Company's mill at Grand Junction, Colorado, where it has been treated, costs about $14.00 per ton.

East German Uranium Mining Shifts to Thuringia

The center of uranium production in East Germany is reportedly being shifted from the Erzgebirge mountain range on the Saxon-Czechoslavak border to the state of Thuringia. Several uranium mines in the Erzgebirge area are believed to be exhausted.

Ore deposits in Thuringia are said to be of good quality and easy to exploit. The richest mines are at Katzendorf and Sorge-Settendorf, near the town of Gera. At the Katzendorf mines, covering 500 acres, thick layers of ore lay from 12 to 60 feet below the surface. About 1,800 tons of ore are said to be produced daily at the Sorge-Settendorf mines.

Some mines in the Erzgebirge area are still being worked, especially in the 20-mile-long valley along the Schwarzwasser river where 200 units are being worked. An estimated 31,000 tons of pitchblende ore were mined in the Erzgebirge mines during 1953. Operations are controlled by Wismut A.G., the Soviet enterprise in charge of all East German uranium mining. An estimated 180,000 persons are employed by Wismut.

Shinkolobe Uranium To Be Used In Swiss Reactor

Uranium from the famous Shinkolobe mine of the Union Miniere du Haut Katanga in the Belgian Congo is to be used as a fuel for a proposed nuclear reactor to be built in Switzerland. About 10 tons of uranium metal will be required. The ore will be refined in England according to the terms of a contract signed in Brussels on September 18.

Uranium Fuel: What is the Outlook?

There is almost universal agreement between physicists, electrical engineers, industrial power engineers, and Atomic Energy Commission scientists that uranium is the fuel of the future. That atomic energy is a practical source of energy and will be used among other things for large electric power plants, ship propulsion, aircraft propulsion, large heating plants, industrial heat, conversion of sea water to fresh water, and packed power plants including very small units is also the belief of many of the nation's leading engineers and scientists.

No one knows when several or all of these will become a reality. The first should be the United States Navy submarine Nautilus launched recently and scheduled for sea trials early next year.

Here is what some of these leading scientists have to say about when peaceful uses for uranium fuel will be a reality.

Jesse C. Johnson, director Division of Raw Materials, United States Atomic Energy Commission, "The first production of commercial power from nuclear fuel is expected between 1960 and 1965. . . . Studies by the Commission, and by large industrial firms working on the problem, indicate that within 10 years nuclear power will be competitive, at least in high cost power areas."

John W. Landis, Babcock & Wilcox Company. ". . . predict that within the next 30 months approximately 20 research and/or package power reactor projects will be initiated in the United States. . . . The transition to nuclear power will not be sharp. . . . The most optimistic nuclear power advocates do not foresee more than 20 percent of the total energy of the nation coming from nuclear fuels before 1975."

F. K. McCune, General Electric Company. "In May of this year I predicted that possibly five years, and certainly 10, would find us generating economical electric power from atomic energy in single purpose plants. . . . I believe that the first economic full-scale commercial power plant will be a dual market plant—designed both to produce weapons material and heat for conversion to electricity."

Edwin A. Wiggin, Atomic Industrial Forum, Inc. "The principal problems today are not concerned with whether atomic energy can be used to produce electric power or even with how this can be done, but with how it can be done economically. . . . I would not guess that many of us will live to see many atomic-powered automobiles."

J. Carlton Ward, Jr., president Vitro Corporation of America. "I want to say that Great Britain is a year ahead of us in the field of the use of atomic energy for public power. Her first power plant will be done, it is expected, at least a full year before the Westinghouse-Duquesne plant." (The Duquesne plant construction at Shippinport, Pennsylvania was started on September 6 when President Eisenhower waved a radioactive wand to activate, through electric circuits, a Caterpillar No. 6 shovel.)

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Australia Opens Two New U_3O_8 Mills on Schedule

Australia entered the list of Free World countries producing uranium on a commercial scale when the Rum Jungle, Northern Territory uranium mill was officially opened by the Australian Prime Minister, R. G. Menzies, on September 17. Construction has taken 21 months, an achievement in view of the location. Cost has been £A3,000,000. The Combined Development Agency provided the capital and some technical assistance. The plant was built by Consolidated Zinc Pty. Ltd. through its subsidiary, Territory Enterprises Pty. Ltd. The British High Commissioner and the United States Ambassador, Amos J. Peaslee were present at the opening. Other prominent figures included the Premier of South Australia T. Playford and the manager of Territory Enterprises, S. Christie.

Two types of ore have been mined and stockpiled adjacent to the mill. One type is copper-uranium in slate. Both primary ore (uraninite which has been found at depth) and secondary ore containing torbernite, autunite, and saleeite will be processed.

After crushing and grinding sulphides are floated off and the pulp is acid leached and filtered. Uranium is precipitated from the filtrate by ion exchange. The primary uraninite is oxidized with manganese dioxide to facilitate its solution in the acid leach. Sulphuric acid for leaching is produced at the site using sulphur imported from the United States.

The mill has been built adjacent to Dyson's open-pit mine where most of production has come from to date. This mine, as well as White's mine and the Mt. Fitch mine, is operated by Territory Enterprises. Underground prospecting is being continued at both the Dyson and Mt. Fitch mines.

Prospecting, both by air and on the ground continues at a rapid scale in the district with most activity covering hundreds of square miles south of the mill.

Australia's second large uranium mill was opened at Radium Hill, South Australia during October. Davidite associated with ilmenite is recovered at this plant by heavy liquid separation. Concentrates from both Rum Jungle and Radium Hill will be refined in the new plant now building at Port Pirie, South Australia which is scheduled for operation early in 1955.

The Government of South Australia is considering the establishment of an atomic power plant on Spencer's Gulf. Such a plant, if undertaken, would probably be of 35,000-kw capacity and is estimated to cost up to £A12,000,000. It would produce power at 1d. per unit.

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No Resharpening

LIDDICOAT BITS and feed leg drilling machines . . . you just can't beat this speedy, cost cutting combination! Designed for efficient, low cost operation, Liddicoat is the bit that is used-to-destruction and then discarded . . . no resharpening . . . no delays . . . no extra costs . . . the ideal bit for easier drilling with feed leg machines.

LIDDICOAT TEE CEE is a tungsten carbide insert bit designed for on-the-job interchange with Liddicoat used-to-destruction bit . . . both fit the same drill steel. Now, you can switch to the most economical bit—right on the job—on the same steel—to meet varying ground requirements. No delay whatever!

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Uranium Development Underway Near Rosamond

The Verdi Development Company and Uranium Mines, Inc. have completed a merger for development of a uranium deposit in the Mojave Desert of California. The property is on seven leases totaling 1,400 acres, located about seven miles north of Rosamond, California.

The new firm, still called Verdi Development Company, plans to spend $30,000 for immediate exploration and, eventually, about $100,000 for a concentrating plant.

Clifford Gillespie, president of the firm, and Jesse M. Ashby, vice president and treasurer, made the original discovery. Other officials are Elliott Gillespie, vice president; A. B. Meiklejohn, vice president and assistant secretary; Charles E. Insley, assistant treasurer; Hiram Lewis and Mrs. Dorothy Shattuck, directors.

Anaconda's Second Major Uranium Mill Expansion

Anaconda Copper Mining Company has a second major uranium mill expansion underway at its Bluewater, New Mexico mill. The first major expansion was under the terms of a contract signed with the United States Atomic Energy Commission on May 18, 1954 which called for additions to existing carbonate leaching facilities for limestone gangue ores and erection of a new mill to treat sandstone gangue ores by acid leaching. The Anaconda mill and these expansions were completely detailed in the August 1954 issue of MINING WORLD, pages 34 to 39.

The new contract signed on September 15, 1954 provides for enlargement of the acid leaching circuit during construction. The reason for the increase in milling capacity was the discovery and delimitation of greatly increased tonnages of sandstone ore on the Laguna Indian Reservation which can be easily mined at a higher tonnage rate per day.

C. F. Kelley, chairman of the board of Anaconda, said that the new units should be in operation in 1955.

While expansion is planned largely for Anaconda ore, the new units will also process ores purchased at the Atomic Energy Commission's Bluewater Receiving Depot that are mined by other companies and individuals.

United States

Personalities in the News

JOHN J. CURZON, manager of the Howe Sound Company's Chelan division at Holden, Washington for the past 13 years, was named deputy director of the mining division at the United States Atomic Energy Commission's Grand Junction Operations office. He has three decades' experience in the mining and metallurgical industries in the northwestern United States, Canada, and Alaska. Early in September ELTON A. YOUNGBERG, acting director of the mining division, was officially named to the position of director. Mr. Youngberg was also with Howe Sound Company before coming to the AEC in 1952.

Several personnel changes have been announced by the St. Joseph Lead Company's New York headquarters. **Lawrason Riggs III**, division superintendent of Indian Creek operations in Missouri's Washington County, is being transferred to Bathurst, New Brunswick, Canada, as resident manager of an affiliate company, Brunswick Mining and Smelting Corporation, Ltd. **L. W. Casteel**, division superintendent at Mine La Motte, will succeed Mr. Riggs at Indian Creek. Returning to Mine La Motte near Fredericktown, Missouri, is **F. F. Redfield**, who has managed operations at Bathurst, Canada for the past year.

Walter K. Scheibe has been named division engineer of Reserve Mining Company's taconite concentration plant at Babbitt, Minnesota.

Kenneth F. Farley, assistant controller, has been named assistant smelter manager of the Calumet Division, Calumet and Hecla, Inc. in Calumet, Michigan. **Raymond J. Marcotte**, present assistant smelter manager, will be transferred to "duties involving special technical assistance to the general manager."

B. R. Coil, formerly assistant general manager for Miami Copper Company and its subsidiary, Copper Cities Mining Company, has been named manager for the two Arizona firms. He first came to Miami Copper in 1938, later becoming general superintendent for the subsidiary Castle Dome Copper Company, which later was superseded by Copper Cities.

A. F. Banfield and **Roland F. Parks** of Behre Dolbear & Company have been in Labrador doing field work in connection with a valuation of iron ore deposits.

Erskine Massey, International Minerals and Chemical Corporation engineer, has been promoted to assistant mine superintendent at Achen, Florida, replacing **John Hatch**. Mr. Massey joined International in 1953.

Roger R. Nelson, Potash Company of America engineer, has returned to the firm's refinery at Carlsbad, New Mexico after a year's leave of absence during which he acted as an instructor in metallurgy at the Colorado School of Mines.

Stanley D. Michaelson has been named chief engineer of western mining divisions for Kennecott Copper Corporation and will make his headquarters in Salt Lake City, Utah. Formerly chief engineer, raw materials, for Tennessee Coal, Iron, and Railroad Company, Mr. Michaelson has also had several years mining experience with Bethlehem Steel Company and Allis-Chalmers Manufacturing Company.

Percy S. Gardner, Jr., Idaho mining engineer, has joined the engineering firm of Frank Eichelberger & Associates in Spokane, Washington. Formerly, he was superintendent of the Silver Dollar mine in Idaho's Coeur d'Alene mining region. He is also inventor of the "Hydraulic Hoist."

John W. Barnes, metallurgical engineer with more than 17 years' experience in the industry, has joined the staff of the processing division, Grand Junction Operations Office, United States Atomic Energy Commission. He will assist in the administration of contracts concerned with the procurement of uranium concentrates on the Colorado Plateau.

John F. Hatch, III, of Mulberry, Florida is the first recipient of the new Mineral Engineering Fellowship at the Harvard Graduate School of Business Administration. The fellowship is available to graduates of the Colorado School of Mines. Mr. Hatch is presently a mine supervisor for the International Minerals and Chemical Corporation at Bartow, Florida.

Program chairman for the 1955 Mining Convention to be held in Denver, Colorado February 3, 4, and 5, will be **Frank Coolbaugh**, vice president of western operations for Climax Molybdenum Company, Climax, Colorado.

ROBERT L. BURNS (left), former MINING WORLD field editor, has been selected to join the Washington State College staff at the University of the Punjab, Lahore, Pakistan as an assistant professor of mining engineering. He is pictured above with Dean JOHN P. SPIELMAN of the Washington State College School of Mines, under whom he studied at Montana School of Mines. Prior to his position with MINING WORLD, Mr. Burns served as a staff member for Orinoco Mining Company in Venezuela. He holds a Master of Science degree in Mining Engineering from Stanford University.

JAMES K. RICHARDSON, Kennecott Copper Corporation, has been promoted to the position of assistant general manager in charge of labor, public and industrial relations at the firm's Chino Mines division, Hurley, New Mexico. He has served as assistant to the general manager of the Utah copper division since January 1952. Mr. Richardson's new position is a newly created one and was set up because of Chino's expanded public and industrial relations program, according to company spokesmen.

William J. Kroll, pioneer in titanium research has been awarded the Francis J. Clamer Medal "in consideration of his invention of a method adaptable to the large scale production of cold malleable commercially pure titanium and zirconium." The award was presented to him by the Franklin Institute of the state of Pennsylvania.

Thomas Condon, industrial engineer, has been added to the Industrial Engineering department of the Calumet Division, Calumet & Hecla, Inc. at Calumet, Michigan. He will serve as senior engineer for the firm.

Claude O. Stephens, vice president, has been appointed general manager of production for the Texas Gulf Sulphur Company, New York City.

Elton Clark, former engineer with United States Smelting, Refining & Mining Company, is now chief engineer of mining operations for the Phelps Dodge Corporation's Burro Mountain mine at Tyrone, New Mexico.

Walter J. Akert has been appointed concentrator superintendent for Kennecott Copper Corporation's Nevada mines division, succeeding **L. G. Immonen**, who recently resigned.

George C. Heikes has been named consulting mining geologist for Camoose Mines, Ltd. of Canada. Mr. Heikes will be in charge of development work on holdings in Idaho, Colorado, Utah and Canada. Camoose recently purchased J. R. Simplot Mining Company's uranium holdings on the Colorado Plateau (See page 85).

Two changes at the Pickands, Mather & Company operations include **Del Carlton**, who was transferred from the Albany mine to Crosby, Minnesota, and **James Young**, assistant engineer at Mahoning, who was transferred to the Albany mine as engineer.

David White, field geologist for the Oregon department of geology and mineral industries since 1953, resigned to accept a position with Alcoa Mining Company at Bauxite, Arkansas. His successor at Grants Pass, Oregon is **Max Schafer**, who formerly worked for the United States Geological Survey on the Colorado Plateau.

"Minus temperatures which cause metals to fail...*leave UNOBA unchanged.*"

William I. Waugaman, General Manager, Usibelli Coal Mine, Inc., Suntrana and Fairbanks, Alaska.

"Although we suspend operation of our strip mining equipment when the mercury dips below –40°, it's not because our Union Oil lubricants become any less efficient – *metals fail first.*

"Let me cite an example: It's been our experience up here in the Alaska interior that minus temperatures which cause the metals of trucks, tractors and shovels to become brittle and fail leave Union's UNOBA grease unchanged.

"UNOBA is the one grease I know of which performs well during our sub-zero winter working season, and 'stays put' during our 95° summer hot spells when equipment must be protected from coal and volcanic dust."

Barium-Lithium base UNOBA is truly a *multipurpose* grease. If your operation requires a lubricant of extreme versatility it will pay you to ask your nearby Union Oil representative about UNOBA.

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Newsmakers in International Mining

MARCUS D. BANGHART, managing director of Tsumeb Corporation, Ltd., South West Africa, and O'Okiep Copper Company, Ltd., Union of South Africa, has been transferred to New York as vice president in charge of operations for the Newmont Mining Corporation. Both Tsumeb and O'Okiep are Newmont subsidiaries. Mr. Banghart had previously been general manager of both companies. Prior to going to Africa he was manager of another Newmont subsidiary, Island Mountain Mines Company, Ltd. in British Columbia. At one time he was general superintendent of the Boston mine at Mokelumne Hill, California.

Harlan A. Walker, general manager of the Marcona Mining Company, operating large open-pit iron ore mines at San Juan, Peru, has returned to his Lima, Peru headquarters after attending the recent mining conference in San Francisco, California. San Francisco is headquarters for the Utah Construction Company, which is operator for Marcona.

Roy B. Young, plant superintendent for Quebec Iron and Titanium Corporation, has succeeded **F. E. Walling** as general manager. The company, owned by Kennecott Copper Corporation and the New Jersey Zinc Company, has mining and smelting operations in Quebec, Canada.

Eugenio P. Lazaro, formerly with the Companhia de Diamantes de Angola in Africa, has taken the position of Administrator of exploitation and exploration for Cia Venezolana Diamante, Venezuela. Mr. Lazaro will be directing operations for the firm's diamond mines in Gran Sabana, Paraitepuy, Venezuela. He has more than 20 years experience in diamond mining in Africa.

Vere Leasure, American Smelting and Refining Company, Chihuahua, Mexico, is planning to retire at the end of the year.

J. H. Salter has been appointed to the newly created position of general superintendent, chemicals and fertilizers division, The Consolidated Mining and Smelting Company of Canada Limited.

John Holgate has been appointed general manager of the Rhodesian Iron and Steel Commission. He has had experience in the iron and steel industry in India, South Africa, and the United Kingdom.

Albert Jackson, general works manager of the Appleby-Frodingham Steel Company, has been appointed a director of the company, which is a branch of the United Steel Companies. Mr. Jackson, who joined the firm in 1920, was awarded a Fellowship of the Institution of Metallurgists in 1946. He is chairman of the advisory committee of the City and Guilds Iron and Steel Operatives' Course.

B. F. J. Schonland, who has been named deputy director of the Harwell Atomic Research Station in England, was chairman of the South African geophysical conference held at the University of the Witwatersrand in July. The conference attracted scientists from various parts of southern Africa and featured speakers from all parts of the world.

J. Brian Eby, Texas consulting geologist and former chief of Shell Oil Company's Gulf Coast geophysical department, has been named a director of the Texas International Sulphur Company. Dr. Eby will be in charge of the company's explorations for sulphur in the Isthmus of Tehuantepec, Mexico. Assisting him will be **G. P. Sales,** chief geologist.

L. W. Shaner, general superintendent of chromite mining operations for the Acoje Mining Company in the Philippine Islands, has resigned.

Raymond Brooks, until recently with Rhodesia Copper Ventures, Ltd., in Southern Rhodesia, has assumed the presidency of the New Discovery Mining Company, Mumbwa, Northern Rhodesia.

Four Japanese mining experts have completed a survey of mineral deposits in the Philippine Islands with particular emphasis upon the holdings of Elizalde and Company, Manila mining firm. The team, from the Mitsui Mining and Smelting Company, was composed of **Chikao Nishiwaki,** mining and geology chief; **Isamu Nagamatsu** and **Kenji Kawai,** mining engineers; and **Tatsuzo Iwafune,** geologist.

JAMES BOYD, exploration manager of Kennecott Copper Corporation, is scheduled to address the eighth annual midwestern meeting of the Society of Exploration Geophysicists this month in Dallas, Texas. Dr. Boyd is considered a pioneer in developing instruments for geophysical exploration and has been exploration manager for Kennecott since 1951. He was director of the U. S. Bureau of Mines from 1947 to 1951, and after World War II as director of industry for SHAEF was in charge of rehabilitating industry in the American Zone of Germany.

Roger V. Pierce, Salt Lake City, Utah consulting mining engineer, has returned from an extensive consulting assignment at Minas de Matambre in Cuba. Mr. Pierce has advised the company on its mining methods for a number of years.

Gunnar Mines, Canadian gold producing firm, has added four directors to its governing board. They include: **Jules R. Timmins,** president of Hollinger Consolidated Gold Mines; **Murdoch A. Macpherson,** Regina, Saskatchewan; **A. Harrison Gilmour,** director of Nesbitt, Thompson, and Company, and **Thomas P. O'Connor,** Toronto.

Denver Post Photo

Nineteen mining experts from 10 European countries arrived in Denver, Colorado late in September as part of their study tour of low-grade ore development in North America. While in the Rocky Mountain area they visited the Colorado School of Mines at Golden. The group is shown above during a meeting with Denver Equipment Company engineers. Members of the team are JOHN SANDOR, secretary of the group, London, England; FRANZ CZEDIK-EYSENBERG, professor at the School of Mines, Leoben, Austria; JOHAN HOHN, professor at Technical University, Vienna, Austria; H. M. I. De MAGNEE, professor at University of Brussels, Belgium; GEORGE DE WITTE, assistant professor at State University, Ghent, Belgium; PIERRE M. GY, Minerals et Metaux, Paris, France; MARCEL SALA, ministry of mines, Paris, France; HEINZ BELKA, engineer, Rammelsberg, Germany; WOLFGANG JACOBS, Berlin, Germany; ADRIANO CAPERLE, department of mines, Rome, Italy; ALESSANDRO REGGIORI, Breda Institute of Scientific Research, Milan, Italy; H. J. De WIJS, professor at Technical University, Delft, Netherlands; HERMAN EBBINGE, The Hague, Netherlands; MAGNE MORTENSON, professor at Technical University of Norway, Trondheim, Norway; P. G. KIHLSTEDT, professor at Royal Institute of Technology, Stockholm, Sweden; K. J. V. SVENSON, Guldsmedshyttan, Sweden; RIZA TUNA, ministry of foreign affairs, Ankara, Turkey; GEORGE E. DAVIES, British Iron and Steel Research Association, London, England; CLEMENT M. RICHARDSON, London and Rhodesian Mining and Land Co., Ltd., Salisbury, Southern Rhodesia.

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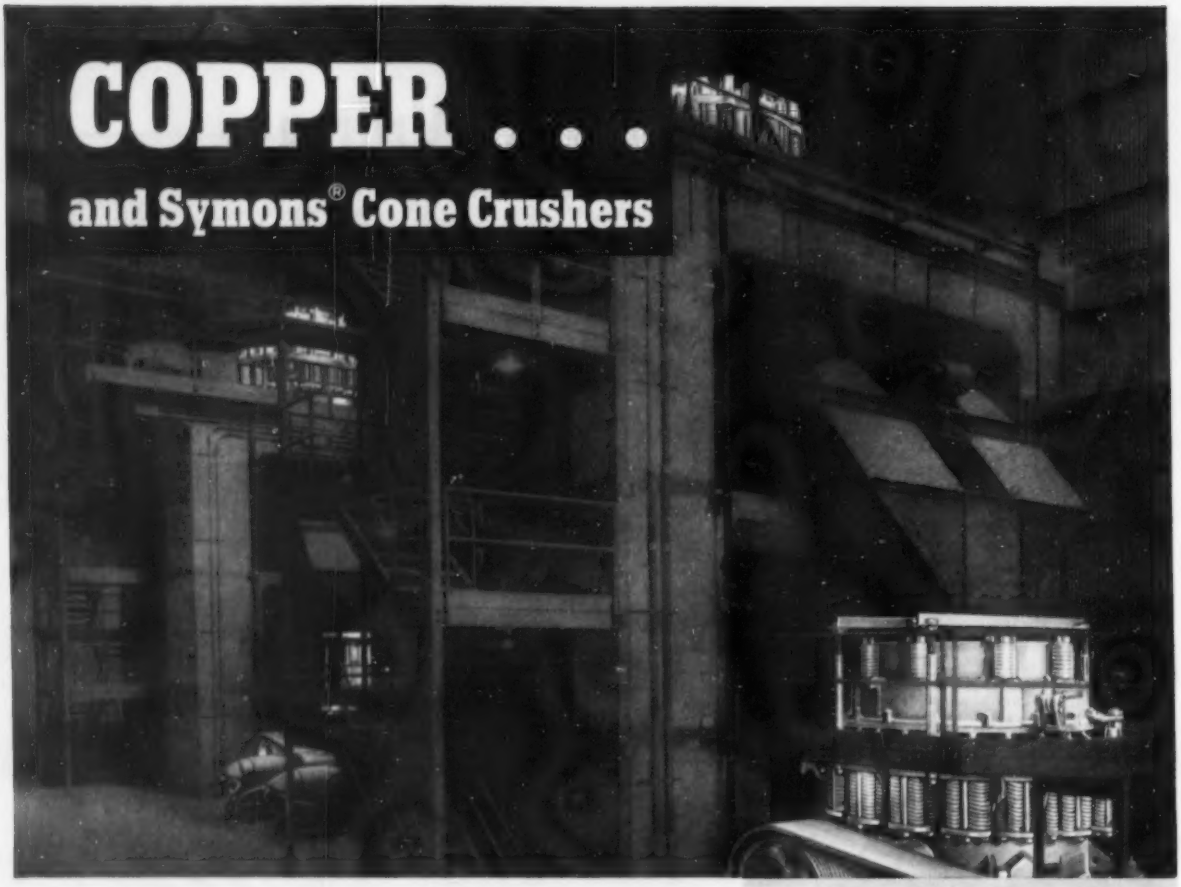

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Symons Cone Crushers . . . the *machines that revolutionized crusher practice . . .* have long proved their efficiency, dependability and economy in the profitable reduction of ores and minerals the world over. In the case of COPPER, it is significant that more than 90% of the world's production passes through Symons Cone Crushers. Throughout the entire COPPER industry, the new and repeat orders for these crushers are continued evidence of the satisfaction given in fine reduction crushing service. The outstanding performance of Symons Cones in delivering a finely crushed product in greater capacities and at lower cost makes them the leading choice of the world s outstanding mining companies.

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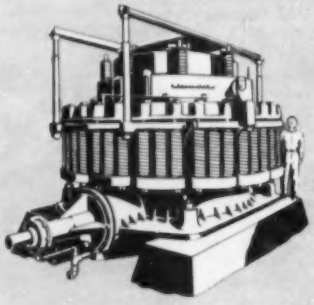

Symons Cone Crushers are built in Standard, Short-head and Intermediate types with crushing heads from 22″ to 7′ in diameter — in capacities from 6 to 900 tons per hour.

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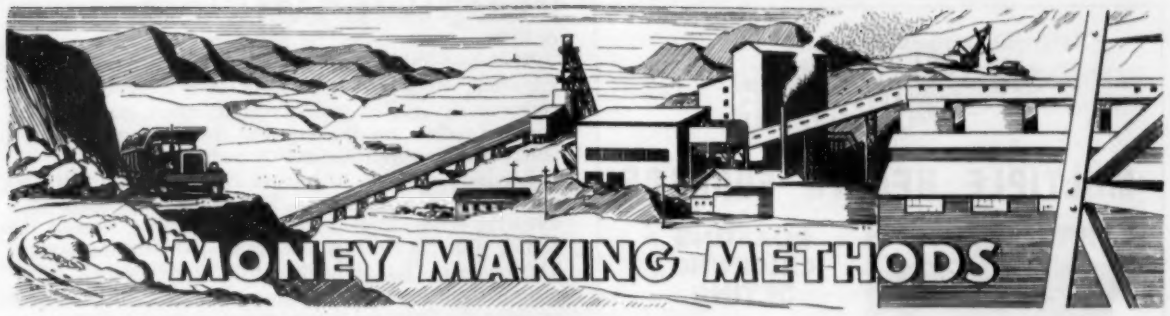


Separan 2610 Deserves a Trial If You Have Filtering Problems

Is your concentrate difficult to filter? Do you have a problem in clearing up your tailing overflow water? Does your mill require acres of thickeners to make a filterable pulp?

If you have any of these problems you have lots of company. In fact certain oxidized zones, particularly in the tropics, while containing ore grade mineralization cannot be termed ore because of the costly, if not impossible, problems of thickening and filtering.

The recent upsurge in uranium recovery in the United States and South Africa has developed plenty of tough filtering problems. Literally acres of filtering capacity are in use in the byproduct uranium plants in South Africa and the clay and mudstone components of Colorado Plateau ores are difficult to filter.

Perhaps the solution to your problems is a new flocculating agent, Separan 2610, that increases the settling rate of dispersed materials, increases overhead clarity, improves filtration rates, decreases cake moisture retention, and increases recovery.

Separan 2610, developed and marketed by the Dow Chemical Company, is a synthetic, water-soluble polymer. It is a white amorphous flake that is readily soluble in water. It operates successfully over a wide pH range.

Most effective usage has been in small amounts distributed rapidly and uniformly at several points to the pulp or solution. Recommended application is in a 0.04 to 0.1 percent solution with the 0.04 preferred. This is roughly equivalent to 0.01 to 0.05 pound per ton of dry solids for settling, and 0.05 to 0.3 pound per ton of solids for filtering.

Initial commercial plant results have in many cases been spectacular. It has improved filtering in cyanide plants; also zinc and copper filtering. In one uranium plant where capacity was limited by the difficulty of filtering and washing the pulp, the addition of Separan increased the filtration rate appreciably. Now the mill has extra filtering capacity and additional plant throughput can be achieved faster and more cheaply than originally contemplated—simply by the addition of grinding capacity.

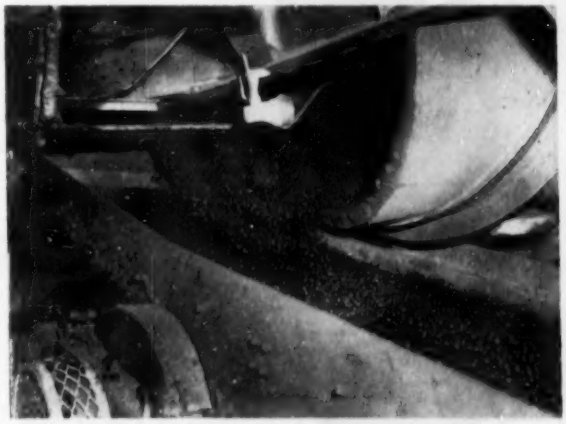
The new reagent is well, and simply adaptable to laboratory tests. You should give it a test in your own laboratory. Commercial quantities and samples are available and technical assistance and directions for use may be requested from Technical Service and Development, Dow Chemical Company, Midland, Michigan.

Reserve Fires Taconite Pellets In Traveling Grate Furnace

The successful development of a new process and marketing of equipment for the heat hardening of pellets made from taconite iron ore concentrates has been announced by Arthur G. McKee & Company, steel-plant engineering and construction firm of Cleveland, Ohio, and Allis-Chalmers Manufacturing Company of Milwaukee, Wisconsin.

An order for the design, engineering, and materials for a new plant, incorporating the process, has been received by the McKee Company from the Reserve Mining Company for its new E. W. Davis Works at Silver Bay, Minnesota. It is estimated that this plant will cost about $19,000,000 and when in full operation will turn out 12,000 tons of pellets each day.

Major advantages of the new metallurgical process for converting taconite concentrate into a pellet suitable for use in a blast furnace include: its extreme simplicity of operation; the utilization of heat recovered from the operation; ease of quality-control resulting from the ability of the operator to see what is going on during the process; the direct and simple discharge of the product from the equipment; and the minimizing of breakage of the pellets because of their stationary position on the grate which carries them through the furnace.



TACONITE PELLETS from this balling drum are fired to make them hard on a traveling grate sintering machine at 2,400° F.

The successful development of the new metallurgical process for heat-hardening the pelletized concentrate resulted from several years of fundamental research by the Allis-Chalmers Research Division, followed by extensive pilot plant testing.

Here is the flow sheet of the new pelletizing plant.

Concentrate fed by a table feeder drops onto a belt conveyor which goes to the pelletizing drum. A small vibrating feeder is mounted over this belt for the purpose of metering additives (Bentonite) to the concentrate. The additive acts as a bonding agent to reduce the possibility

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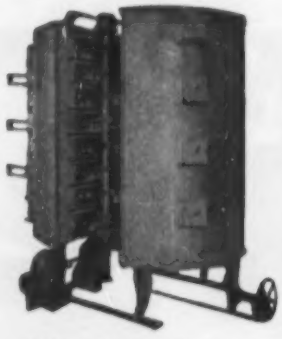

Pacific Laboratory Furnace

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Manufactured in two sizes—36" and 54" inside diameters having 6-8-10 Hearths and include the same features as the commercial size furnace.

Pacific Furnacing Unit

NEW
PACIFIC FURNACING UNIT

Higher shell height. Three gas burners. Provision for conversion to muffle unit. Small volume roasts at any desired temperature.

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of breakage when the concentrate is rolled into pellets, or balls.

The concentrate next goes into the pelletizing or balling drum, which is an open drum set at a slight angle and continuously revolving. Concentrate enters at the higher end and pellets are discharged at the lower end. Acceptable pellets are approximately ½ inch in diameter.

Provision is made to remove those pellets which did not meet size requirements. This is done by means of a vibrating screen located under the discharge end of the balling drum. All pellets are discharged onto this screen. The undersize fall through onto a conveyor belt which returns them to the belt feeding the balling drum. Upon entering the drum for the second time these pellets act as seed pellets and literally keep the balling process going in the balling drum.

Correct size pellets pass across the vibrating screen and fall onto a conveyor which passes under a metering coal-feed device and feeds the coal reroll drum. Powdered coal is added to the pellets on the conveyor. In the coal reroll drum the pellets go through the same type of action as in the balling drum, but the purpose differs. Here the powdered coal is rolled into the surface of the pellets.

The pellets are next conveyed onto the traveling grate of the heat-hardening furnace or sintering machine. A belt conveyor which oscillates much like an ordinary house fan, deposits an even layer of pellets across the full width of and to the full depth of the grate pellets.

The pellets, as they are deposited on the grate, are called "green" pellets.

In the process of forming the pellets a certain amount of moisture is necessary to cause the concentrates to become pellets. Now, however, moisture is undesirable because the purpose of the furnace is to harden the pellets by heat. Therefore, the first phase is pre-drying, which is accomplished by an up-draft of hot gases passing through the entire bed of pellets. These hot gases come from the discharge end of the grate where the pellets that are already burned are cooled by air passing down through the pellet bed.

From the pre-drying phase the grate passes under a three-compartment furnace. The first compartment is used for down-draft drying and utilizes hot gases from the recuperation wind-box for this purpose. The second compartment is used for preheating the pellets, and additional heat from a burner located in this compartment supplements the temperature.

The last compartment is the ignition chamber and incorporates a burner for increasing the temperature to 2,300° to 2,400° F, which ignites the top layer of pellets. This burning zone progresses uniformly down through the pellet bed, with burn-through taking place as the pellets reach the recuperation wind-box. The ignition wind-box gases are exhausted to atmosphere.

After passing over the recuperation wind-box the pellets pass over the cooling wind-box and are then discharged through a grizzly deck onto a wire belt conveyor. They are then conveyed to the outside of the building where the finished pellets are screened and stockpiled.

Fungicidal Paint For Mines

In many mines molds and fungi destroy wood and painted surfaces. The United States Department of Commerce has made many tests to determine the effectiveness of 80 fungicidal (mold-resistant) compounds in paint. Department tests have shown that copper-8-quinolinolate has the strongest fungicidal effect, is comparatively nontoxic, and is resistant to water leaching.

Mining Reforms Slated For Mexican Congress

Sweeping changes in Mexico's mining laws, including the section of the constitution governing controls over industry, are expected to be presented in the current session of Congress.

Main sponsors of the reforms are Alberto Terrones Benitez, president of the First Senate Mining Committee who, in addition to the contemplated constitutional changes, is drawing up a number of other bills affecting mining, and Congressman Filiberto Ruvalcaba, who also is general secretary of the Mexican Mine Workers Union.

While the exact nature of Terrones Benitez' proposals are not known, Mr. Ruvalcaba reports that he will seek adoption of legislation covering the following points:

1. Creation of a Mining Ministry to deal with problems of industry;
2. Government "protection" of mining, including solution of the electrification problem existing in many parts of the country;
3. Nationalization of properties abandoned for five years;
4. Imposition of stiff taxes upon so-called "impure metals," such as copper, lead, zinc, bismuth, etc. which are refined abroad;
5. Establishment of a smelter in a "strategic" section of the country to which both large and small producers would have access, and a chain of small metallurgical plants for treating low-grade ores now regarded as unprofitable;
6. Opening of technical offices to guide investors as to the possibilities of various mining zones;
7. Founding of a government Mining Bank to finance mining operations.

Lepidolite Firm Acquires More Rhodesian Claims

The Lepidolite Development Corporation Ltd. has acquired the Mops lepidolite claims at Salisbury, Southern Rhodesia. This property is only a short distance from the company's Mauve mine which is the third largest lithium-ore producer in the Federation of Rhodesia and Nyasaland. (See MINING WORLD, August 1954, page 33.)

Two lepidolite-pegmatite bodies have already been opened up by shallow quarries on the Mops claims. The pegmatites display an unusual regularity of mineralization. Although the dikes are only approximately 10 feet wide, the central part consists of a 3- to 4-foot-wide, almost solid core of fine-grained banded lepidolite.

The largest part of ore from this zone carries more than 3.5 percent Li_2O, and is directly marketable. The remaining lower grade lepidolite is to be stockpiled for the future milling program. Due to very flat dips of the pegmatites, quarrying and excavation by a ¾-yard shovel will be possible over a considerable area. A production of several hundred tons of lepidolite per month is to be started shortly.

The company also recently started development work at the Grand Duke lepidolite mine at Odzi in the Umtali District. An intensive search is being carried out to locate other lepidolite deposits.

During 1953, the company produced 2,097 tons of lepidolite from the Mauve and Winston mines at Salisbury, and 1,344 tons in the first seven months in 1954.

Electrolytic Cobalt Now A Reality in Canada

The first commercial production of electrolytic cobalt in Canada has been initiated by the International Nickel Company of Canada, Ltd. at its Port Colborne refinery in Ontario. Improvements in refining techniques made the new process possible.

Heretofore Inco's entire cobalt has been marketed as oxides and salts produced at its Clydach, Wales, refinery. Through its new process the company makes available a high purity cobalt which is a fitting companion to its electrolytic nickel. This electrolytic cobalt will be particularly valuable in the manufacture of alloys where high purity is advantageous.

Inco's electrolytic process for the production of cobalt was developed after extensive research and pilot plant studies by the company.

Cobalt is one of 13 elements recovered from the company's Sudbury District, Ontario, ores. Nickel, of course, is the principal product. The others are copper, platinum, palladium, ruthenium, iridium, rhodium, gold, silver, selenium, and tellurium. In addition, Inco furnishes high quality smelter gas for conversion into liquid sulphur dioxide and normal smelter gas for sulphuric acid production. Iron will soon be recovered as premium grade iron ore.

Italy's Mineral Output Shows Few Signs of Change

Only minor changes in Italian mineral production are expected during the remainder of 1954 as compared with 1953 figures, according to available information. Mercury production is rising only slightly, despite the increase in price and and sustained demand from foreign markets. Reason given for this small increase in output is that Italian mercury ore is now of much lower grade than that previously mined, so that while the tonnage extracted during the first six months of 1954 was 17.7 percent greater than the corresponding 1953 period, metal production was greater by only 10.7 percent. Also, there is a hesitancy on the part of mine operators to expand facilities in light of the possibility that the mercury boom may be short-lived.

A shift in activity for iron ore mining is reported, with more production expected from the Sardinian mines and less from the Elba region. Lessening demand by the steel mills for manganiferous iron ore has been a factor in the 26 percent decrease in manganese ore production reported for the first half of 1954.

Increased production of lead and zinc concentrates is already evident, although production of low-grade crude calamine used for zinc and zinc oxide is still decreasing. Sulphur mining continues to be in a critical condition. Exports are still quite small, and more than a year's reserve is on hand. Many sources feel that government aid will be necessary to keep the industry from collapsing.

Exclusive Mineral Concessions Awarded in Mozambique; First Ones Granted Since 1945

Two exclusive mineral concessions covering a total area of 25,000 square kilometers in Mozambique—Portuguese East Africa, have been granted to Ake Viking Lillas of Nassau, Bahamas, British West Indies. These are the first exclusive concessions granted in Mozambique since 1945 when the Gulf Oil Company obtained an oil concession. Until now, both areas had been government mineral reserves closed to prospecting.

The new mineral concessions confer exclusive rights for prospecting and exploration of all mineral deposits with the exception of radioactive minerals and are situated in the Inchope and Tete areas.

In the Tete concession an aerial survey and mosaic photography of 10,000 square kilometers have already been carried out by the Aero Service Corporation of Philadelphia. Geologically, the area consists of a central massive of ultra-basic rocks covering approximately one fourth of the concession, surrounded by acid and also alkaline intrusive rocks, basement schist belts, and coal-bearing shales of the Karroo formation (Permo-Carbonian). Preliminary geological reconnaissance proved the area intensely mineralized.

Several magnetite iron ore zones were found extending over many miles and occurring as magmatic segregation of the Swedish Kiruna type. Close-by and included in the concession are the virgin Muaradzi coal-fields. Several gold and copper deposits occur in the area. These have been extensively mined in the dim past of early African history by an unknown race and later by Arabs and early Portuguese. Gold placers have been identified in the gravels of the Pomfe and Revugue rivers. Other mineral occurrences include rutile deposits (TiO_2) in situ and alluvial, corundum, mica, and columbium minerals.

The concession is traversed by the Tete railway link which has recently been completed and connects with the Beira port on the Indian Ocean. The navigable part of the Zambezi River forms the southwestern boundary of the area.

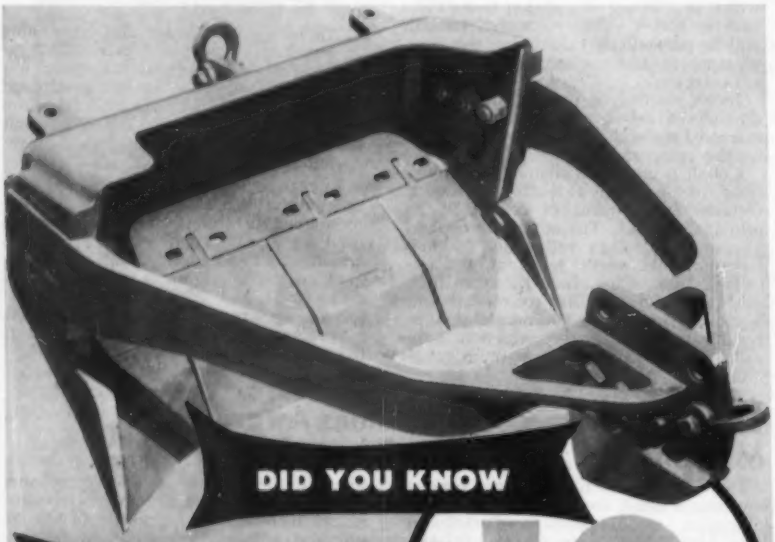
The Inchope concession is situated to the north and south of the Beira port—Rhodesia railroad. Geologically, it consists mainly of acid and alkaline intrusives of various ages embracing remnant blocks of basement schists. A promising tin-belt has been recognized there, stretching almost across the entire concession from west to east. Tin has been found here in numerous greisen zones, but high-grade alluvial placers have also been identified. A smaller tin-columbite zone was found in the north-eastern section at the outskirts of the Mt. Gorongosa batolith. Various corundum, gold, mica, and lithium-mineral occurrences have also been located.

The concession holder plans an intensive mineral search to prove the potentialities of an iron-coal project, accompanied by a study of the hydro-power potential of the Pomfe and Revugue rivers and systematic exploration of the gold and copper occurrences.

Photogrammetric methods and photogeologic interpretation are to be applied, together with systematic geological mapping of the areas, diamond drilling, scintillation surveys etc.

MALAYA—The Registrar of Malayan Statistics reports that Malayan tin metal exports in August totaled 6,025 long tons. Of this amount, 3,775 tons were shipped to the United States; 825 tons to Europe; 142 tons to the United Kingdom; 344 tons to the Commonwealth countries; and 939 to "others."

INDIA—The *Indian Copper Corporation Ltd.*, in reporting on last year's activities, comments that the production results and shipments made showed an increase over the previous year, if due allowance is made for the loss sustained during a three-month strike period. In its *Mosaboni* and *Badia* copper mines total footage developed, copper content, and average stoping width all showed a decrease. During the year lateral development was restricted in order to concentrate on the more important development of the mines in depth. Main development at Badia was around the 9th and 10th levels, the results of which continue to be disappointing. Shipments of kyanite decreased by 5,650 tons as compared with the previous year. The Government of India restricted the company's export quota to 7,627 tons as compared with 17,161 tons in the previous year and this accounted for the decreased shipments.



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THAILAND—*Thailand Tin Mines, Ltd.*, subsidiary of *British American Tin Mines, Ltd.*, has closed its tin mine in Yala province because of high production costs and lower prices. Reported to be the second largest tin mine in Asia, it had been operated under concession from the Thai government since 1934. The Thai government is reportedly negotiating with the company for purchase of the firm's modern equipment, including three newly imported electric generators.

MALAYA—The Federal government is considering the levying of a tax on the export of tin ore and ingots in order to finance its research program on the production of tin. A circular has been sent by the Mines Department to the All-Malayan Chinese Chamber and the Federated Malay States Chamber of Mines asking their reactions to such a tax. The All-Malayan chamber has already gone on record as unanimously opposing the plan. It contends that such a tax would greatly increase the burden which miners already shoulder.

PAKISTAN—Discovery of fluorite deposits in three places in West Pakistan has been reported. One is in the Kohimara Range, 25 miles from Kolpur (Baluchistan), another at Kalai, 18 miles from Kojekazi near Fort Sandeman; and the third at Sherwan in Hazara district. The deposit near Fort Sandeman is already being prospected by the Geological Survey of Pakistan, and prospecting in the Kolpur area will start shortly. Though the Sherwan deposits are believed to be of lower grade than those in Baluchistan, they are more extensive. The Geological Survey is also reported to be considering geophysical prospecting of the magnetic deposits of the Raskon area in Baluchistan

JAPAN—The *Okura Shoji K.K.*, a Japanese trading firm, is negotiating with Russia for imports of 250 kilograms of platinum at about $650,000. *Shinten Jitsugyo* recently signed a contract for importing of 150 kilograms of platinum from Russia in exchange for a tug boat. It is rumored that Shinten, in turn, will re-export the platinum to Brazil.

MALAYA—The Miners' Association of Selangor, Negri Sembilan, and Pahang is seeking a nominated seat for the tin mining interests in the Selangor State Council. Colonel H. S. Lee, president of the Association, said at the annual general meeting that under the Federal Elections Bill the All-Malaya Chinese Mining Association would have the right to nominate two members to the Legislative Council. Said Lee, if mining interests would continue to be represented at the Federal level, he could see no reason why the same could not be applied at the state level. The Association had a nominated seat on the State Council from 1948 until last year. There has been no representative since then.

INDONESIA—Since the change in political status of Indonesia, the mining department has undergone some changes, too. All mining activity is under the direction of the Kementerian Ekonomi (Ministry of Economic Affairs). The Direktorat Pertambangan (Directorate of Mining) reports to the Ministry. In turn, the directorate supervises the Djawatan Pertambangan (Department of Mining); the Djawatan Geologi (Department of Geology); issues grants for exploration

and development of minerals; and governs state-owned mines directly. The department of mining controls all operations of private mining groups, with regard to payment of duties and taxes, safety of workings, difficulties, etc., while the department of geology controls study of volcanoes, performs geological surveying, explores for mineral deposits and water wells, and makes mineral analyses for private individuals.

LATIN AMERICA

MEXICO—Reportedly the first cobalt deposits to be discovered in Mexico have been located in the municipality of Villa de Guadalupe, San Luis Potosi State. The claims were filed by Indalecio and Saturnino Leal, Durango mining men.

PERU—The *Tangana* lead-zinc mine is now in operation and has made its first shipment to the *Banco Minero* concentrator at Huachocolpa. Development work has been under way since May. About 17 kilometers of road have been built and over 1,000 meters of mine development completed. Production at present is about 50 tons of ore a day and this is to be increased to 100 tons daily very shortly. Investment to date is $250,000. The property contains ore assaying about 10 percent lead and 20 percent zinc, and is located in the Province of Castrovirreyna, Department of Huancavelica. Tip Croome is superintendent of the mine.

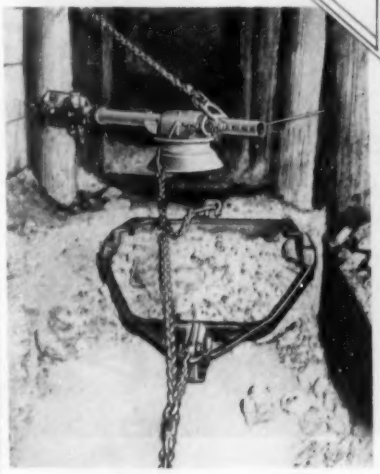
BRITISH GUIANA—A $155,000 down payment has been made to *Barima Gold Mining Company (Canada) Ltd.* by *Northwest Guiana Mining Company* for Barima's manganese property in British Guiana. The balance of $465,000 is to be paid upon completion of legal details. Northwest Guiana, a subsidiary of *Union Carbide and Carbon Corporation*, has been exploring the property for the last year on an option agreement. Barima plans intensive exploration of some new property it will acquire with the additional funds. One block consists of about 9,000 acres in the Mazaruni district where the presence of columbium, tantalum, gold, and diamonds has been established, with indications, also, of titanium and thorium. In the Northwest district, the firm has applied for exclusive prospecting rights to 320,000 acres where mica and quartz crystals appear evident. Barima also retained the gold rights to the property acquired by Northwest Guiana and Barima will test these showings.

PERU—*Marcona Mining Company* is reported to have shipped more than 2,250,000 long tons of iron ore from its property in the Department of Ica since mining was started last year. Marcona was formed by the *Utah Construction Company* and *Cyprus Mines Corporation* to undertake this project. Three open pits have now been opened; eventually they will be interconnected. Among recent improvements are the installation of two secondary crushers, the increase of storage capacity to 100,000 tons of shipping ore, and the start of an exploration program. At the port, a two-unit plant to distill sea water has been erected. The plant is said to be the only one of its kind in South America, and has a capacity of 2,400 gallons per hour. A power plant generating 2,320 kilowatts has gone into operation, and ore storage capacity at the port has been increased to 130,000 tons. Mining is carried on under a 30-year contract with the Peruvian *Santa Corporation* with about $1,500,000 in royalties paid last year. At present all ore is shipped to the *United States Steel Corporation*, but a portion will be sent to a steel plant at Chimbote, Peru when it is completed by French interests in 1956.

VENEZUELA—Iron ore exports to the United States during the first six months of this year totaled 2,183,420 tons, as compared with less than 2,000,000 tons for the entire period of 1953. The increase is attributed to start of export operations by *Orinoco Mining Company* in January 1954. Orinoco is a subsidiary of *U. S. Steel Corporation*. The remainder comes from the *Iron Mines of Venezuela*, a subsidiary of *Bethlehem Steel Company*. The largest ore carrying ship, the Ore Chief, sailed from Puerto Ordaz on August 2 with 22,100 tons of iron ore from Orinoco's *Cerro Bolivar* deposit. On the next trip, it was scheduled to carry 43,000 tons.

BRITISH GUIANA—*Illinois Zinc Company* is reported to have obtained options to buy controlling interest in *Columbium Corporation*, with concessions covering 50,000 acres in British Guiana. The properties are said to contain columbium and tantalum. Engineers are now checking the property.

Schematic Arrangement of "R-T-C" Installation



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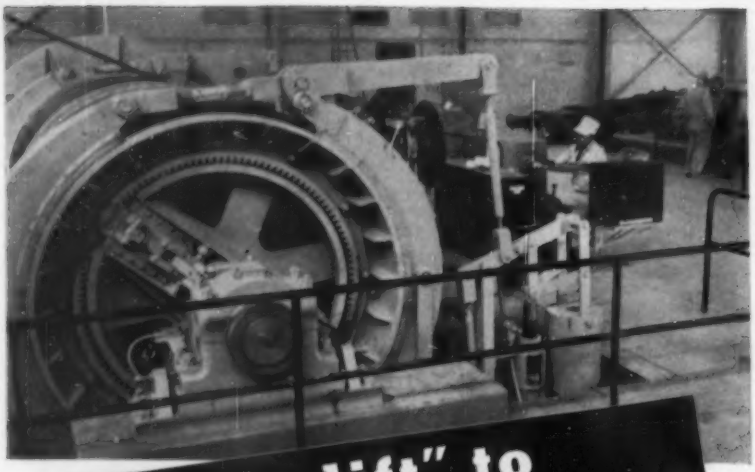

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INTERNATIONAL

CHILE—The *El Romeral* mine near La Serena is expected to begin iron ore production by the end of this year. About 1,000,000 metric tons of ore are expected to be produced annually, with an iron content of 60 to 62 percent. About 400,000 tons of this will go to local steel mills, and the balance will be exported. Present Chilean output is about 2,500,000 tons annually, with *El Tofo* deposits supplying 2,000,000 tons of this. Reserves there are reported to be decreasing, but recent surveys have indicated other deposits at Algarrobo near Vallenar. Proven reserves there are set at 60,000,000 tons, and estimated reserves at 150,000,000 tons.

COLOMBIA—For the three-month period ended August 31, *Bulolo Gold Dredging, Ltd.* dredged 3,478,750 cubic yards to recover 11,540 ounces of fine gold. In the same quarter of 1953, 3,113,150 cubic yards were dredged to yield 19,892 ounces of fine gold.

MEXICO—Reportedly the country's first fluorite chemical plant will be established in San Luis Potosi with an investment of 1,000,000 pesos. Ismael Garza is the engineer in charge of the project. He says that the plant will be devoted to production of synthetic cryolite.

ARGENTINA—The *Winston Steel Works, Inc.* of Sacramento, California, recently designed, fabricated, and shipped to San Francisco two tungsten mills in a record 6 weeks. The buildings, along with Western Machinery Company equipment, were exported to *Sociedad Minera Argentina, S.A.*

MEXICO—Such excellent progress is being made on construction of the large and modern ore wharf at Tampico that the Navy Department expects it to be in service before the end of the year. The wharf will cost 12,000,000 pesos ($960,000), and is being built under contract by the Tampico Stevedores Union which does construction work as well as the loading and unloading of ships.

NORTH AMERICA

NORTHWEST TERRITORIES—*Giant Yellowknife Gold Mines Ltd.* reports that for the year ended June 30, 1954, production amounted to 177,421 ounces of gold and 31,103 ounces of silver from milling of 275,985 tons of ore. Of the total ore hoisted during the year, 9 percent came from A shaft workings, 76 percent from B shaft, and 15 percent from C shaft. The main production shaft (C) was deepened 500 feet to enable lateral development work to be carried out on the 950, 1100, and 1250 levels. The actual sinking program was completed during the year, but a considerable amount of work remains to be done on stations, loading pocket, sumps, and ore and waste passes, before lateral development can start. Discovery of the new G. B. Zone and its partial development on the 750 level, development of the Muir Zone on the 575 level, and the further delineation of the North ASD Zone below the 750 level were encouraging features of the year's exploration work. During the year an agreement with *Conwest Exploration Ltd.* to purchase seven *Lolor* claims

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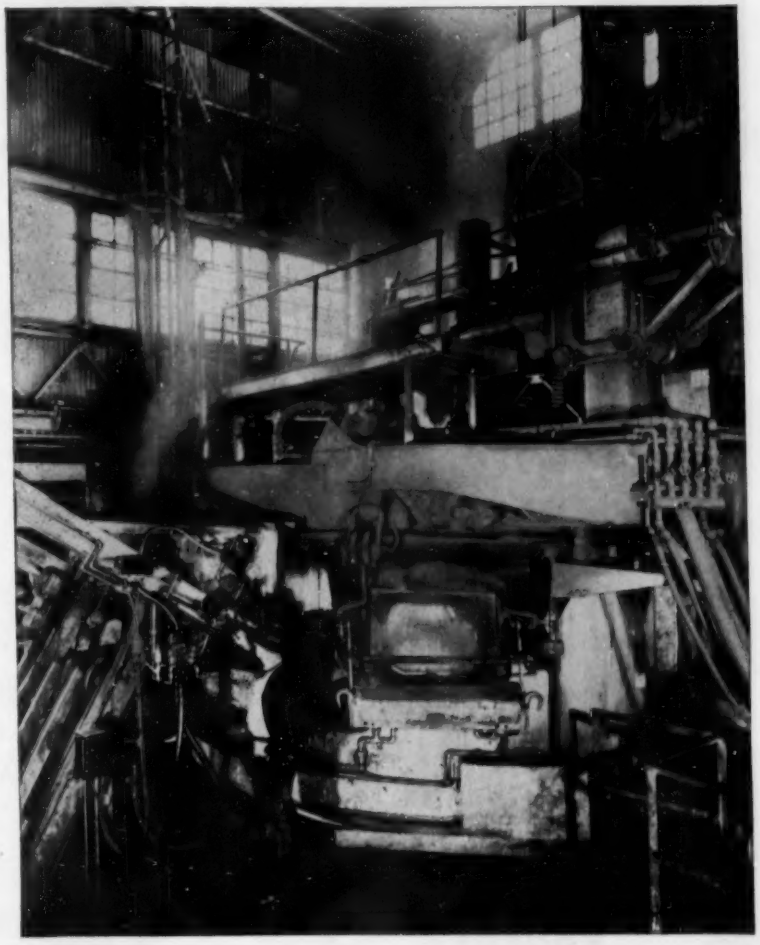

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was exercised and *Lolor Mines Ltd.* was incorporated to acquire the claims. Giant Yellowknife owns 87.5 percent of the interest.

BRITISH COLUMBIA—*Highland-Bell Ltd.* has started a $250,000 exploration project at its *Wallace Mountain* property near Beaverdell. The work will test an ore body indicated by diamond drilling east of the Terminal fault. Three holes encountered good-to-rich silver values over widths ranging from six inches to nearly eight feet. Production has been declining in recent months due to lower grade of ore treated in clean-up operations. K. J. Springer is president.

SASKATCHEWAN—*Lorado Uranium Mines Ltd.* has completed sinking of a three-compartment shaft to a depth of 231 feet on the *Alco* property on the southwest shore of Beaverlodge Lake. A station is being cut on the 220-foot level, and a drive will begin shortly toward the ore zone indicated by surface drilling. A contract for underground work calls for 1,000 feet of lateral work and raising. Also planned is a series of flat diamond drill holes from the 220-foot level.

QUEBEC—*Rainville Copper Mines* is unwatering its shaft and underground workings to permit resumption of development work at its copper property in Bourlamaque township, Val d'Or district. New funds have come from an agreement with *Canadian Malartic Gold Mines*. This necessitated a reorganization and change in name to the *Rainville Mines Ltd.* Canadian Malartic will manage the company and direct the planned underground program. About 1,675 feet of crosscutting and drifting, and 15,000 feet of underground drilling are planned.

ALASKA—The *United States Steel Corporation* is currently prospecting in southeastern Alaska for iron deposits. It is also reported that the firm is staking the legal limit of limestone claims each month. Limestone is used for flux in iron blast furnaces.

BRITISH COLUMBIA—*Sunshine Lardeau Mines, Ltd.* has optioned the *Eclipse* mining claim adjoining its *Spider* silver-lead-zinc mine in the Lardeau district and is planning to test the claim along with the *Hazel* group. Third quarter production from the Spider totaled 255 tons of lead concentrate and 267 tons of zinc concentrate. John Drybrough is president.

QUEBEC—*Ascot Metals Corporation* has entered the uranium field through the acquisition of an indicated uranium deposit from the *Trio Uranium Mines Ltd.* in McDougall Township. Development so far has opened up six showings by trenching. Ascot plans to proceed immediately with a vigorous development campaign consisting of detailed mapping, continued surface trenching, and extensive diamond drilling. Trio also holds extensive acreage in Henvey Township to the north where very little work has been done. Ascot also plans to explore this by surface trenching and geologic mapping.

NORTHWEST TERRITORIES—*Ridley Uranium Mines* is currently mapping and surface exploring its 24-claim uranium prospect at Stark Lake, Great Slave Lake district. The zones will be tested by pitting and sampling, and systematically mapped and explored with scintillometers. A surface drilling program is also scheduled for this season.

ALASKA—*Northern Pyrites Corporation*, a subsidiary of *Texas Gulf Sulphur Company*, is reported to have taken a two-year option on the Horseshoe Bay pyrite deposit on Latouche Island, Prince William Sound. Total option price is said to be $170,000. Geophysical exploration is now being carried out on the property, where production of sulphur and sulfides has been increasing in recent years. Metallurgical improvements are now making the recovery of iron also possible along with the sulphur.

BRITISH COLUMBIA—Underground work has started on the gold-silver property of *Deer Horn Mines Ltd.* where eight months' operational supplies have been moved in and a winter camp has been completed. The adit crosscut to the main ore area has been collared and at last report was in 40 feet in well-mineralized quartz. Simultaneous with the Kitimat operations, Deer Horn has started to drill on its uranium acreage adjoining the Rexspar ore development in the Kamloops sector of the province.

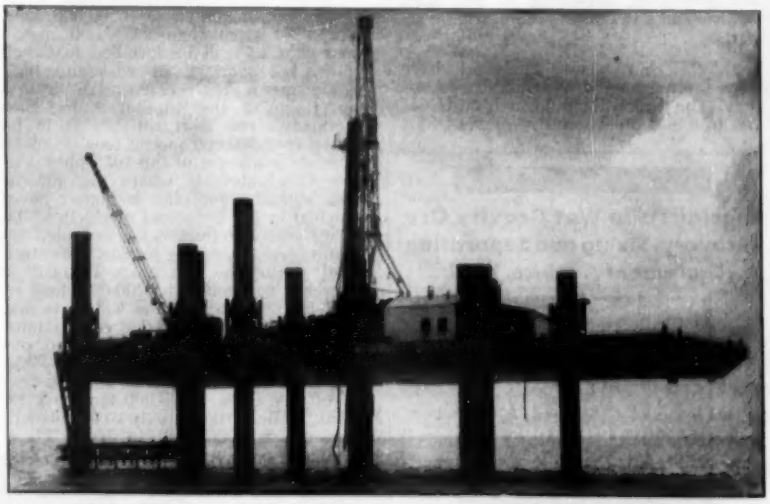
ONTARIO—*Violamac Mines* has started a diamond drilling program on its base metals property in the Cirrus Creek section of the Killala Lake area. A limited amount of surface work has been done on the property which was located by an airborne geophysical survey. A brecciated rhyolite shear zone reportedly has been traced a distance of 2,000 feet. Several trenches have indicated values in copper, nickel, and silver.

QUEBEC—*Molybdenite Corporation of Canada* is showing a steady increase in production since the resumption of operations last March. For the six months ended August 31, output totaled 480,339 pounds of molybdenite, and 38,592 pounds of bismuth. Of this amount 105,938 pounds of molybdenite and 8,243 pounds of bismuth were produced in August alone. The firm has a contract with the United States to deliver over a 62-month period up to 6,000,000 pounds of molybdenite and about 450,000 pounds of bismuth.

SASKATCHEWAN—*Twin Bay Uranium Ltd.* has carried out an active exploration program at its properties in the Athabaska district during the summer field season. The company now holds 73 claims in the area. Geological and scintillation counter surveys have been carried out on all claims except the *Bub* and *Twin* groups, which were most recently staked. In addition rock blasting and trenching are under way on the *Bob* group on Cameron Island, and some rock work on the MWS group at Nero Lake where swampy ground has made exploration difficult.

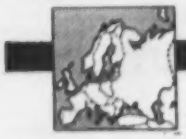
QUEBEC—*Northern Quebec Explorers, Ltd.* has completed a survey and surface exploration of its properties in the Landrienne Township, where four pegmatite dikes have been located near the south boundary. A molybdenite vein and two other pegmatite dikes have been located in the northern part of the claims. Surface work carried out on three of the dikes in the southern part showed crystals of beryl as well as lepidolite. More surface work and a drill program are planned.

BRITISH COLUMBIA—Diamond drilling at Western Nickel Mines' property on the Canadian Pacific railroad, 110 miles east of Vancouver, has cut what appears to be good-grade nickel-copper ore in a hitherto unexplored section of the mine. Other drilling has proved the downward continuation of the Brunswick No. 2 ore body and located a hitherto unknown ore body.



Humble Uses Movable Platform in Sulfur Tests

Humble Oil & Refining Company is using the new DeLong portable drilling platform (above) for its 20 sulfur-exploration drill tests being conducted on a salt dome about six miles off the southern coast of Louisiana near Grand Isle (See *Mining World*, August 1954, page 57). Standard-type platforms have long been used in the oil industry but the new portable platform may dominate future off-shore drilling activities. The platform above measures 80 by 206 feet and 8½ feet thick. When the barge-platform is in place over the drilling site, 10 legs (or caissons) are sunk down and into the ocean bottom. Huge jacks then raise the platform upward until it is suspended about 30 to 40 feet over the water. The process is reversed when the barge-platform is to be moved to another location. Humble has leased the underwater acreage from the Federal Government. The 2,500-foot tests are expected to take about two years and will be studied for oil and gas possibilities as well as sulphur.



EUROPE

NORWAY—The first aluminum ingots have been produced at the huge new aluminum plant at Sunndalsora, one year ahead of schedule. However, full production rate 40,000 tons annually will not be achieved until next year. Norway's present output is about 55,000 tons a year. Nearly all of this will be exported. Aage Owe is managing director of A/S *Ardal* which will operate the plant. Estimated cost of its erection is £12,500,000, about two-thirds of which has been financed by a United States loan which will be repaid in the form of aluminum ingots.

AUSTRIA—Production decreased slightly in some of the Austrian mines during July. Output was 248,705 metric tons of iron ore, 101,592 cubic meters of salt brine, 83,300 tons of magnesite, 15,387 tons of copper ore, 8,862 tons of lead-zinc ore, 993 tons of antimony ore, and 1,816 tons of bauxite.

PORTUGAL—The Ministry of Economic Affairs has approved exports of 25,000 tons of iron ore and 22,500 tons of pyrite to West Germany during the second half of 1954. Also approved was the export of 600 tons of wolframite to West Germany during the 12-month period ending June 30, 1955.

BULGARIA—Production of ores during the first half of 1954 exceeded the output of the same period in 1953 by 14 percent in iron ore, and 20 percent in lead-zinc ores, according to the Sofia government's statistical administration reports.

U.S.S.R.—Two new ministries have been formed for the metallurgical industries. The Union-Republican Ministry of the Iron and Steel Industry of the USSR and the Union-Republican Ministry of the Non-Ferrous Metallurgical Industry will take over respective enterprises and organizations falling under these categories. Also under consideration is the formation of a Union-Republican Ministry of the Iron and Steel Industry of the Ukranian Soviet Socialist Republic.

ENGLAND—A plant for the melting of titanium and titanium alloys is to be installed by *William Jessop & Sons* of Sheffield—a unit of the B.S.A. group. In due time, a special plant to form these metals into vital aircraft parts will also be installed. Technical aid reportedly has been obtained under an agreement with one of the largest United States producers of titanium. Last year was such a successful one for *British Titan Products Company, Ltd.* that it plans a further increase in plant capacity. *Laporte Titanium Ltd.* announces that its plant at Stallingborough, North Lincolnshire, is now producing at full rated capacity but that, as the world demand for titanium oxide still remains unsatisfied, the firm will duplicate its plant.

SWEDEN—Iron ore exports during the first half of this year totalled 6,141,000 tons, compared with 6,768,000 tons in the same period of 1953. Domestic consumption of iron and steel is estimated at 860,000 tons, compared with 750,000 tons in the first half of 1953.

U.S.S.R.—The Soviet Union's Fifth Five-Year Plan, to end in December 1955, will see an annual production level of 44,200,000 metric tons of steel produced in the USSR, in contrast to the 1953 claimed production of 39,000,000 tons. During 1953, the steel output of Czechoslovakia, East Germany, Hungary, Poland, and Rumania combined totalled 14,000,000 tons. The Czech crude steel capacity in 1953 reached 4,350,000 tons, while production amounted to 3,500,000 tons. For 1954 more than 2,000,000 metric tons capacity will be installed in Czech mills, but shortage of coal and high grade ores makes economical utilization uncertain at the present time. East Germany's raw steel capacity is to be raised to 2,400,000 metric tons, to make possible fulfillment of the 1955 plan. Unlike Czechoslovakia where the government's production plan is almost never reached in full by actual production, the East German production has exceeded the plan's level (especially in electric furnace steel) during the past years. Hungary is expected to produce 2,200,000 tons of steel in 1954, and pig iron will be turned out at a rate of 1,200,000 metric tons. Poland's two steel mills will turn out 2,200,000 metric tons of steel, and 5,000,000 metric tons of pig iron. Rumania expects to reach a 2,000,000-ton mark by 1960. In Bulgaria the only steel mill will turn out 800,000 tons in 1955. These increases will provide an annual East Block steel production of between 16,000,000 and 20,000,000 tons. Together with the 1955 level of Soviet steel output, the USSR and its satellites will have between 60,000,000 and 64,000,000 metric tons of steel capacity in 1960.

NORWAY—Improvements made on the Ofoton Railway which carries iron ore from Sweden to the Norwegian port of Narvik will make it possible to increase shipments from 10,000,000 to 15,000,000 tons a year. The work now completed enables bigger trains to be used, and since the middle of July trains with 65 loaded ore cars have been running along this line to Narvik. Three new locomo-

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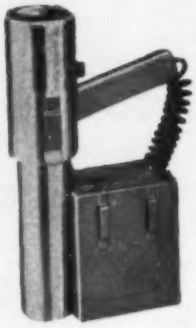

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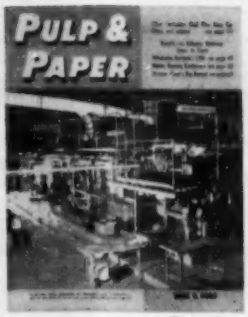

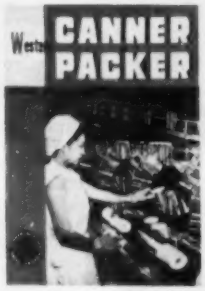

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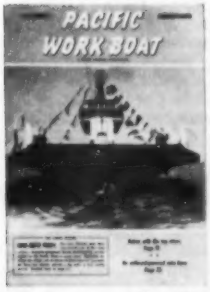

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INTERNATIONAL

tives generating 4,500-horsepower each (the most powerful in Norway) have been acquired.

ITALY—During the first five months of 1954, production of mercury ore reached 99,492 tons, compared with 81,273 tons in 1953, and 77,584 tons in 1952. Production of mercury metal was 746 tons against 655 tons and 764 tons, respectively, in the first five months of each year. Exports totaled 1,551 tons during the first six months of 1954 and 454 tons in the first six months of 1953 and 1952.

UNITED KINGDOM—A report from London states that restrictions on pig lead shipments from the United Kingdom to Iron Curtain countries have been relaxed. At the same time a recent advance in lead prices in London was noticed, which some observers believe was in anticipation of the increased trade. As yet, Soviet lead purchases are reported to be quite small.

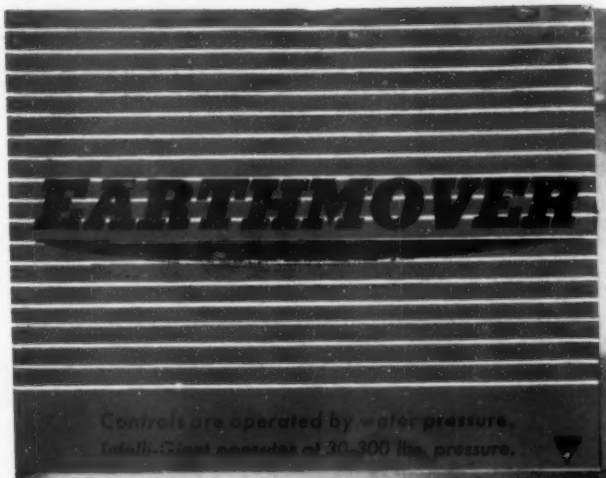
YUGOSLAVIA—an export goal of 45,000 tons of magnesite has been set by the government for 1954. Sintered magnesite, which has accounted for 40 percent of the total magnesite export in the past 12 months, is expected to comprise between 25,000 and 30,000 tons of the total. The program is part of an effort to increase exports of magnesite products while decreasing raw magnesite exports. Shipments of the raw product have declined from 16,553 tons in 1951 to 4,062 tons in 1953.

OCEANIA

TASMANIA—*Moina Tungsten Tin Mining Company N.L.* at Moina has completed its surface crushing plant. Equipment for concentrate production is on the site and ore from old workings has been stockpiled for treatment. Operations may start early next year at a rate of 400 tons weekly.

PHILIPPINE ISLANDS—Four Japanese experts recently inspected mineral properties of *Elizalde & Company*. They visited the *Sipalay* copper mine at Sipalay, Negros Occidental; the *Marinduque* iron mine; *Samar* iron mine; and the *Masara* mine at Davao. While in the Islands, they also inspected the *Acoje* chrome mine at Santa Cruz, Zambales. Representing Japan's largest smelting firm, the team was composed of Chikao Nishiwaki, mining and geology chief of the *Mitsui Mining and Smelting Company;* Isamu Nagamatsu and Kenji Kawai, mining engineers; and Tatsuzo Iwafune, geologist.

WESTERN AUSTRALIA—Intensive investigation of the Hill 50 Area at Mount Magnet is now under way with several newly formed companies undertaking programs of geological investigation and diamond drilling. *Hill 50 Gold Mine N.L.* in its latest reports advises values ranging from 21.4 dwt. to 46.4 dwt. on the 1,060-foot level. *Hill 50 Central N.L.* has now drilled two holes, one of which passed through 35-dwt. ore over 23 inches at the 686-foot level. The company has completed surveys on the *Perseverance* and *Perseverance East* leases. *Hill 50 Consolidated N.L.* has begun dewatering



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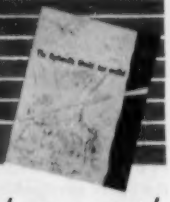

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of the old shaft on the *Hesperus Dawn* lease and is cleaning out the shaft on the *Brown Hill* lease. To date, *Hill 50 Gold Mine N.L.* is the only operator and promises to develop into one of Australia's richest mines.

NORTHERN TERRITORY—*Australian Development N.L.* reports excellent developments at its *Noble's Nob* mine at Tennant Creek. Drilling from the 135-foot level indicates an orebody between 110 feet and 183 feet, assaying 35 dwt. per ton. The firm is now producing at the rate of about 3,000 tons per month of 1.5 ounce ore. Also at Tennant Creek, *Peko Gold Mines N.L.* is developing well. Production has been underway for about three months. Both copper and gold are present, some especially high copper values being reported. Monthly throughput is 1,250 tons of ore for a recovery of 350 tons of 24 percent Cu concentrate. Concentrates are presently being sold to Japan because of the high Japanese copper price. The company intends to proceed with plans for FluoSolids roasting, leaching and electrolytic refining based on a daily output of 12 tons of cathode copper. Costs will be high because power is Diesel electric and estimated to cost five pence per unit.

TASMANIA—The *Electrolytic Zinc Company of Australasia Ltd.* at Risdon produced 24,330 tons of zinc during the quarter ended July 28. The company's mines near Rosebery treated 46,000 tons of ore for recovery of 13,500 tons of zinc concentrate, 2,200 tons of lead concentrate, and 1,600 tons of copper concentrate. Lead and copper concentrates are exported to the United States. Zinc concentrate from Broken Hill, New South Wales, is treated at Risdon in quantity sufficient to make up the deficiency between plant capacity and the supply of Rosebery concentrate. The company's new 55,000-ton-per-year ammonium sulphate plant is expected to go into operation at the end of this year.

WESTERN AUSTRALIA—*Great Western Consolidated N.L.* at Southern Cross and Bullfinch has deepened the main shaft to 1,735 feet. Further work has been completed on underground crushers. Recent ore intersections have varied between 3.5 and 7.0 dwt. per ton. Tonnage in the four-week period to September 7 totaled 33,556 but grade was only 2.8 dwt. for 4,616 fine ounces recovery.

PHILIPPINE ISLANDS—A six-man Japanese survey team is now in the Islands investigating the possibility of developing iron ore mines at Larap, Luzon, and Samar. The team includes representatives from Japan's "big three" steel companies: *Yamata*, *Fuji*, and the *Japan Steel Tube*. It is headed by Kamekichi Wada, Yamata's iron section chief. The two-month survey is based on findings of an earlier mission sent to the Philippines last year. The team is scheduled to make a stopover in Malaya, enroute home, to inspect the *Dungun* mines in Trengganu state.

NEW SOUTH WALES—*Torington Uranium Mines N.L.* will soon begin drilling and shaft sinking activities at Torington. Trenching on Block No. 8 has given Geiger counts of 2,000 with indications of improvement at depth. Further trenches are to be excavated at 200-yard intervals. Torington is in the New England area, which in the past 75 years has yielded a number of minerals, particularly tin and industrial diamonds.

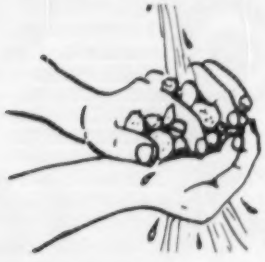
TASMANIA—The *Australian Aluminum Commission's* plant at Bell Bay, near Launceston, is expected to begin production of alumina at the start of next year. Production of metallic aluminum will not commence for several months thereafter, and will be limited by power supplies available from the Tasmanian Hydroelectricity Commission.

NEW ZEALAND—*Arahura Gold Dredging Company Ltd.* shows somewhat improved monthly returns. In June 299,000 yards were dredged to recover 882 ounces of gold bullion; in August 315,000 yards were dredged to recover 951 ounces of bullion.

What is

Mass Action

in Ore Scrubbing?



"Mass Action" in a HARDINGE CONICAL SCRUBBER is similar to the effect obtained by rubbing a handful of pebbles between the palms in a stream of water.

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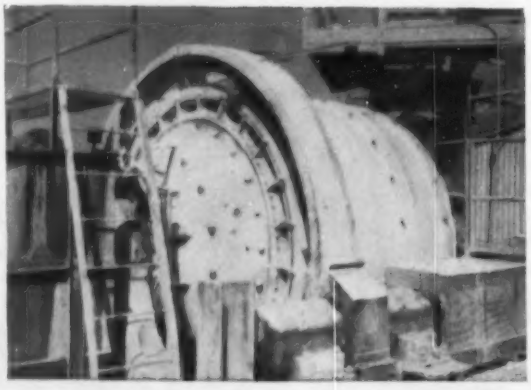

View of a 10' x 66" Hardinge Scrubber cleaning crushed dolomite in a California plant. The trommel screen is at the left.

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AFRICA

UNION OF SOUTH AFRICA—The very satisfactory rate being maintained in opening up the *Loraine* mine in the northern section of the Orange Free State gold field has been largely due to the absence of severe faulting and large water-bearing fissures. This favorable condition has also made possible the start of test milling. Providing that the present rate of development can be maintained, regular gold

production should be started in March of next year. The milling rate will thereafter be progressively raised to 100,000 tons a month as rapidly as possible. Financing for a monthly rate of 75,000 tons has already been arranged and additional funds will be provided for the additional capacity. Reef development in the mine started in the first quarter of last year and to June 30th this year had been confined to the No. 1 shaft area. Reef development in the No. 2 shaft area has started now.

SOUTH WEST AFRICA—*South African Minerals Corporation* reports the continued increase in the production of manganese ore, with output in August the highest since the start of operations. Recently eight new ore bodies were opened up. At the end of July 9,700 long tons of manganese ore were shipped to the United States; another 10,000 tons were shipped from Walvis Bay in September. A large body of high-grade pyrolusite also has been opened up, and negotiations are underway for sale of this material which is used in South Africa's uranium byproduct plants.

MAURITANIA—A United States Foreign Operations Administration loan of $1,428,000 has been granted to the French government as an aid in development of the copper deposit at Akjoujt. The loan is to help finance a public works program connected with the mining operation, providing principally for installation of harbor facilities on the Mauritania coast, water exploration for the mining operation, and improvement of desert roads to the coast.

UNION OF SOUTH AFRICA—*Freddies Consolidated Mines* has been accepted as a uranium producer and uranium production will be started by the end of the year. The arrangements provide that a certain tonnage of slimes will be pumped for treatment in the Welkom uranium plant, where spare capacity will be available during the early stages of uranium production. Since the recent amalgamation of *Freddies North* and *South* into Freddies Consolidated Mines, the rate of development has risen and will be extended further. This will increase the ore reserves and facilitate larger scale stoping operations.

GOLD COAST—*Ariston Gold Mines'* record output for August at 35,000 tons yielded the unprecedted level of 11,975 ounces of gold. Gross revenue for the month at £148,490 was also a record. Extra hoisting equipment has since gone into operation and this is expected to increase the monthly output to more than 40,000 tons. The neighboring mine of *Gold Coast Main Reef*, also under the direction of the Ariston general manager Frank Clelland, had a record month in August, too, with profits at £22,396 compared with £17,335 in July. A noticeable improvement in the grade of ore was responsible.

MOROCCO—The washing plant at Gundafa in the Atlas south of Marrakech has been closed. The deposit was formed in a fracture in Cambrian limestone; mineralization is chiefly zinc-bearing and rarely exceeds 150 meters in extent, with as little as 40 or 50 meters thickness. The ore pipe could be followed regularly enough over more than 200 meters in height up to the minus 165 level. In order to save mining and unwatering work, the *Societe Miniere de Gundafa* opened an 800-meter crosscut at the minus 270 level

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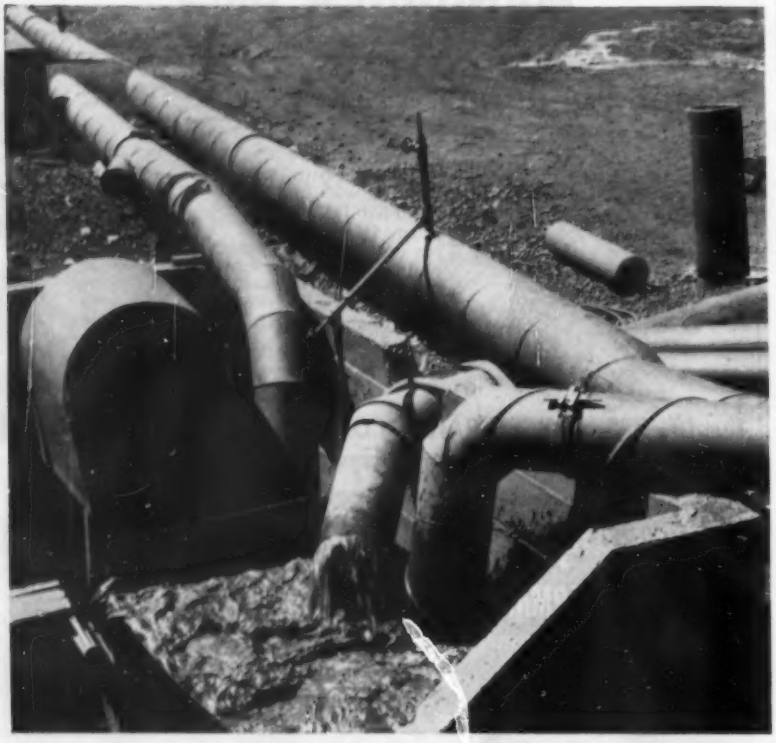

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a few years ago. This was 150 meters below the former production level. This crosscut cut the pipe but there were no spots of enrichment that could compare favorably with those of higher levels. Further exploration is now in progress between level minus 165 and level minus 270 in an attempt to strike the main ore pipe.

UNION OF SOUTH AFRICA—The first gold from the *Harmony* mine was poured on September 11th when the reduction plant was officially opened by the general manager of the *Central Mining and Investment Corporation*. On the 23rd of September, the first gold from the *Virginia* mine was poured. These made the seventh and eighth producers in the Orange Free State gold field. To be started next year is work on an additional mine in the Sand River section of the Free State. The first milling unit of the Harmony reduction plant now in operation has a capacity of 45,000 tons a month; a second unit of like capacity is expected to be in operation about the middle of next year. The uranium plant is in the last stages of construction and is likely to be in operation about the end of this year. The Virginia mine will be a producer of sulphuric acid and uranium as well. Current extensions to the gold plant are designed to raise milling capacity to 75,000 tons a month. The sulphuric acid plant, one of the world's largest, has now gone into operation and the uranium plant will be completed early next year. *Kennecott Copper Corporation* has contributed the greater portion of the capital spent to bring Virginia into production.

NIGERIA—*Mines Development Syndicate* is seeking £100,000 to implement a limited underground program from existing shafts on its lead-zinc-silver property in southern Nigeria. One part of the program is to prepare for development of the ore. *American Smelting and Refining Company* was at one time interested in the property and spent over £600,000 in exploration work before it withdrew its option.

UNION OF SOUTH AFRICA—A major merging of mining interests was recently announced. The *General Mining and Finance Corporation* has made an offer to acquire the entire share capital of *Strathmore Consolidated Investments* on the basis of an exchange of one General Mining ordinary share for two Strathmore shares held. The directors of Strathmore have accepted this offer and have recommended that all other shareholders do the same. The Strathmore company is substantially interested in the *Stilfontein*, *Hartebeestfontein Buffelsfontein*, and *Ellaton* mines in the Klerksdorp district, as well as in other mines such as *Babrosco* and *New Klerksdorp Gold Estates*, and other enterprises in the Union and Southern Rhodesia. Following this offer, it was also announced that the *Anglo American Corporation* has agreed, subject to the completion of the above merger, to subscribe for 199,108 General Mining ordinary shares at a cost of £822,500. In turn, General Mining will use this money to purchase certain securities from Anglo American. These are thought to be mainly shares in Stilfontein, Hartebeestfontein, and Buffelsfontein companies. Of these three, the first and last are in the Strathmore group and second, Hartebeestfontein, in the Anglo-Transvaal group.

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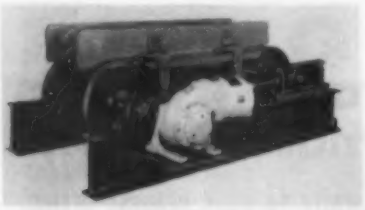

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The Magnetic Engineering & Manufacturing Company of New Jersey recently developed a new self-contained magnetic separation unit that automatically removes tramp iron before it can damage costly equipment, cause fires or contaminate products.

The machine is available in both electro magnetic and permanent designs, and is packaged in stationary or portable styles, horizontal or inclined, depending on requirements. Circle No. 49.

New Twin-Engined Crawler Developed by Euclid

The Euclid Division of General Motors recently announced development of a twin-engine crawler tractor of revolutionary design. The experimental model has gone through its paces on the General Motors Proving Ground.

It develops 380 horsepower with its two GM Diesel engines. Each engine drives an Allison Torque Converter and Allison Torqmatic Transmission. Top speed is 8 miles per hour. Circle No. 50 for further information.

Crawler Mounted Drilling Units Now Available

The trend toward crawler mounted self-contained drilling units is becoming increasingly evident. Saving on equipment, time and manpower are encouraging the widespread usage of this recently developed unit.

This machine consists of a track-type tractor with large front idlers, rear power take-off to drive the compressor, one or two rock drills with 6 to 12-foot feeds, an air receiver and a compressor.

The Caterpillar Tractor Co. recently announced that several manufacturers are prepared to supply a package consisting of compressor, drills, and brackets for mounting on Caterpillar tractors. These firms include: Gardner-Denver Co., Jaeger Machine Co., Joy Manufacturing Co., LeRoi Manufacturing Co., Worthington Corp., Hart & Hart, Utah Sprocket & Machine Co., and Butler Sparks Co. Circle No. 43.

New Flocculating Agent Is Announced by Dow

A new flocculating agent that is said to reduce product loss in mining and related industries as much as 80 percent has been announced by The Dow Chemical Company, Midland, Michigan.

This new material, known as Separan 2610, increases the settling rate of dispersed materials, as well as improving filtration characteristics of pulps. Figures released by the company state that overhead clarity has increased as much as five times, and has resulted in an increase of as much as 5 percent in product recovery. Faster filter rates resulting from the use of Separan 2610 has reduced the filter area normally required by as much as 88 percent. Moisture content of filter cakes was reduced by 5 percent. For additional details circle No. 41.

New Removable Rubber Lining for Use on DorrClone

The Dorr Company announces the redesign of the standard 6, 12 and 24 inch diameter DorrClones. Known as the Type FR these wet classification units now have replaceable molded rubber inserts. This rubber lining will increase considerably the operating life of sections not previously lined. Rubber replacement sections will be extremely easy to install and less costly than equivalent parts used in the old design.

In the exploded view above, five molded rubber liner sections forming the cone fit into the two piece casting. Clamp ring at lower left retains apex section in lower casting. Circle No. 44.

When Euclid previewed its new twin-powered, 380-horsepower tractor early in September at Milford, Michigan, these foreign distributers were on hand to see the new unit. They were: 1st row (kneeling) George Ausenda, Compagnia Italiana Forme Acciaio, Italy; Stanley Schmitt, Storer & Cia. S. de R. L., Argentina; Pelayo Riera, Cia. Riera, Toro & Van Twistern, S.A., Cuba; J. J. Zand, Caspian Trading Company, Iran; M. Takata, Kyokuto Boeki Kaisha, Ltd., Japan; and Charles Keller, Charles Keller Baumaschinen, Switzerland. 2nd row (standing) Philip Gotuaco, Philippine Engineering Corp., Philippines; Alberto Lopez, Maquinarias Mendoza, C. A., Venezuela; H. Okamoto, Kyokuto Boeki Kaisha, Ltd., Japan; Henri J. de Tabet, Henri J. de Tabet, S.A.R.L., France; Alberto Isaza, Maquinaria Industrial, Ltda., Colombia; William Shapland, Bernard Sunley, Stanley Draper, John Blackwood Hodge & Co., Ltd., England; Fabian Sviadosch, and Fernando Barrera, Equipos Industriales y Agricolas, S.A., Mexico; and F. Deutschle, Charles Keller Baumaschinen, G.m.b.H., Germany. 3rd row (standing) P. H. Malenchini, Euclid Division, GMC; Hans Stubbe, General Farm Equipment Co., Puerto Rico; Knut Fredriksen, A/S Auto Supply Co., Norway; Enrique Luque, Maquinaria Industrial, Ltda., Colombia; Philippe St. Cyr, Henri J. de Tabet, S.A.R.L., France; Robert Urbye, A/S Auto Supply Co., Norway; E. J. van Naerssen, Lindeteves, Inc., New York; Pekka Halopainen, Halopainen OY, Finland; Luis Rincon, Equipos Industriales y Agricolas, S.A., Mexico; and Ken Deardorff, Euclid Division, GMC.

CUT YOUR SLUSHING COSTS: If slushing is an important phase of your operation you will want to investigate bulletin 259 issued by the Alloy Steel & Metals Company of Los Angeles. Included is information and operating instructions for the Pacific Round-the-Corner Sheave Block and its applications to cross slushing. Circle No. 15.

LIME SLAKERS: The Hardinge Company, Inc. has just issued a new 4-page brochure, Bulletin No. 50, covering the Hardinge Lime Slakers. The literature briefly describes the continuous milk-of-lime prices and shows the general arrangement and dimensions of various size systems. For your copy circle No. 33.

NEW TWIST FOR BELT CLEANER: The Stephens-Adamson spring type conveyor belt cleaner is designed to remove material adhering to the belt after discharge, thus insuring maximum belt life by preventing cover wear. Steel wiper blades perpendicular to the belt surface, but diagonal to its line of travel, scrape off material, allowing it to fall to the discharge chute. Wiper blades are mounted on spring arms so that pressure against the belt can be adjusted for different operating conditions. For further details circle No. 34.

NEW PULL SCRAPER: The Allis-Chalmers Manufacturing Co. has added a medium-sized, rubber-tired, pull scraper, Model 108 to its line. The new unit has an 8.4 cubic yard capacity, struck, or an 11 yard capacity heaped. Features include a 3 piece reversible type cutting edge, free floating type front apron, a low, wide bowl, and positive, forced ejection. You can get additional details by circling No. 35.

WIRE ROPE USERS: Of interest to those who handle, use, and deal in wire rope is a new Macwhyte bulletin number 5448 called Ropeology. In this release are shown slings, tow lines, cable assemblies, etc. Copies may be obtained by writing the Macwhyte Company, Advertising Department, Kenosha, Wisconsin, or circling No. 25.

LABORATORY EQUIPMENT: Bico Inc. of Burbank, California has taken over the Braun line of laboratory crushers, pulverizers, sieve shakers, sample grinders, and assay furnaces. For more information on their products and how they can help you circle No. 31.

FRICTION TYPE MINE HOISTS: Aros Electric, Inc., of New York has released a highly interesting booklet on Asea Mine Hoists of the friction drive type. Here is a full discussion of the friction-drive principle, the multiple rope principle, and the advantages of these hoists over the conventional drum types. Circle No. 5 for more information.

COMBAT CORROSION: The Electric Steel Foundry of Portland, Oregon, has developed another new alloy, a 0.03 maximum carbon stainless steel. Company spokesmen state that one of the greatest advantages of the extra low carbon grade of stainless steel is to minimize the corrosion adjacent to welds under severely corrosive conditions. For details circle No. 6.

HYDRAULIC RAIL BENDER for lightweight mine rail will soon be marketed by the Aldon Company of Chicago, manufacturers of heavy hydraulic and screw type rail benders. For descrpitive literature circle No. 7.

CASH IN ON URANIUM: The El-Tronics Company of Philadelphia has introduced a new line of Geiger counters and scintillators tailored to meet a variety of needs. For amateur prospectors low priced units ranging from $39.95 up are available. For more precise surveys, sensitive scintillators are offered. For a descriptive catalog circle No. 8.

AIRBORNE RADIOMETRIC SURVEYS with the Nucliometer made by the Detectron Corporation of North Hollywood, California, is said to offer several advantages for rapid surveys. The unit is composed of 24 Geiger tubes. Although the scintillator is more sensitive per unit area than a Geiger counter, the large sensitive area presented by the cluster of 24 Geiger tubes makes it superior for broad area surveys. Circle No. 9.

HEAVY MEDIA EQUIPMENT: Laboratory heavy media equipment for batch or continuous HMS processing of ores is described in a new bulletin prepared by Western Machinery Company of San Francisco. Application information and product characteristics, as well as specification drawings and data covering the Wemco HMS Laboratory Cone Unit, the Laboratory Drum Unit and the Laboratory Media Cleaning Unit are included. Bulletin L-1-I-1 may be obtained by writing to Western Machinery Co., 760 Folsom Street, San Francisco, or circling No. 28.

"FEEL" DRILL BIT ACTION: The Acker Drill Company of Scranton, Pa., has available a new bulletin describing their line of LD and LLD portable powered core drills. Rated capacities up to 400-feet with an EX hole make these units ideal for exploration. Both models feature a rugged rotary drill head. The model LD also has a built-in cathead hoist, a built-in displacement pump, and three speed transmission. A hand lever feed enables operators to get the feel of the bit. Circle No. 1.

PNEUMATIC CONVEYORS: "How to Pull Dollars Out of Thin Air" is the title of a bulletin published by the Fuller Company. The bulletin tells how costs can be reduced substantially by using the proper pneumatic handling system. Also covered are the Fuller rotary compressor, the clinker cooler, and the new kiln preheater. Complete descriptions of Airveyor and Airslide systems are given. Circle No. 2.

VALVES FOR YOUR PLANT: The Ledeen Manufacturing Company of Los Angeles has issued a 16-page bulletin covering a complete line of standard 4-way hand, foot, power and solenoid operated valves. Operating cycles, flow cycles, dimensions and weights, and circuit diagrams. For your copy circle No. 3 or write the company at 1600 So. San Pedro St., Los Angeles 15, California.

AUXILIARY TRUCK TRANSMISSIONS: The Truckstell Manufacturing Company has come up with two items of interest for truck operators. The first is an auxiliary 2-speed transmission for those units which have adequate gear splits but need greater pulling power for steep grades. The second is a 3-speed model designed to meet the need for extra power gears and gear splits in all popular size trucks. Circle No. 4 for details.

THE PAGING TELEPHONE is an electronic means of communication employing some of the features of a common line telephone system and a paging system. The called party is paged by lifting the telephone handset from the hook-switch and depressing a paging button in the handset. The call is then carried over paging amplifiers. When the handset is removed from the hook-switch that station's paging amplifier is muted. For further information on the Industrial Physics and Electronics Company's unit circle No. 23.

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NEW P & H ELECTRIC SHOVEL is explained in bulletin X-162. The model 1055-E is similar in size to the standard 3½-yard P & H Model 1055 but is completely electric, driven by constant-speed AC motors throughout. For your copy write the Harnischfeger Corporation, Large Excavator Division, 4611 West National Avenue, Milwaukee 46, Wisconsin or circle No. 10.

P & H ELECTRONIC CONTROL using grid control thyratron tubes for the first time on any electric shovel is applied to all operating motions. It is said that the electronic control results in finer performance characteristics, more rapid response, better coordination for the operator and a cycle which is 5 to 10% faster. For details circle No. 11.

SINTERED-PLATE nickel-cadmium battery developed by the Sonotone Corporation will be distributed by the National Mine Service Company in the mining industry. Powering of shuttle cars, mine locomotives and mine jeeps are among the immediate future applications of the battery. It is said that the closely-packed, sintered-plate construction greatly increases active material area providing large capacity in small cell volume. Circle No. 12.

DATA ON PACKING brake lining and friction material is contained in a new catalog issued by Johns-Manville of New York. Specifications, uses, and how this material is applied is contained in the description. For your copy circle No. 13.

HUGE VIBRATING SCREEN: A vibrating screen with an increase in capacity of 30 to 40% over the smaller models has been announced by the Hewitt-Robins Company. Despite its large size, company personnel point out that the screen still retains the live-action, three-way vibration built into the smaller models. The new units will have horizontal vibrating and dewatering screens available up to 6 by 24-feet in the double-deck model. For more information circle No. 20.

MAGNETOMETERS: Mt. Sopris Instrument Corporation of Boulder, Colorado, consulting engineers specializing in scientific and industrial electronic instruments, now offer a magnetometer employing a saturable core detector. This type has been used extensively in airborne magnetometers for several years. For more information circle No. 30.

UNDERGROUND MINING: The right combination in mining equipment, dependability, economy of operation, and long life is the topic of a new booklet, Underground Mining With Caterpillar, just released by the Caterpillar Tractor Co. Copies of form D465 are available by circling No. 22.

INSTRUMENTATION: Bulletin 9050, "Instrumentation for Steam Generation" is a convenient, one source reference for all products of the Industrial Division of the Minneapolis Honeywell Regulator Company, applicable to steam generation. Circle No. 17 for your copy.

STOCKPILE AND WINDROW LOADER: An improved windrow and stockpile loader at lower price is the announcement made by Athey Products Corporation of Chicago. This machine, model 7-11, was developed to give the user a loader matched to his job. The model 7-11 can be fitted with two types of moldboard-feeder arrangements that can meet all job conditions. For further information on the loader circle No. 53.

PICKUP TRUCKS: The International Harvester Export Company has prepared a new catalog on the all new International One Hundred series pickup trucks. The catalog contains information, illustrations, and specifications on the features of this unit. For your copy circle No. 54.

RECORD YOUR MINE COSTS: The American Mine Door Company has issued a booklet designed for the use of the mine superintendent or foreman to use in making a special spot check analysis of his mine activity, to see what each operation is costing. At each designated spot or operation an American Mine Door device is illustrated and its advantages outlined. Circle No. 14 for your copy.

CONTROL AND METERING DEVICES: A new general bulletin, listing and illustrating the complete line of recording automatic controlling, and telemetering instruments made by the Bristol Company is available by circling No. 39.

SPIRAL RAKE THICKENERS: A new catalog by the Denver Equipment Co. explains the function, application, and construction of their Spiral Rake Thickeners. The catalog also contains a section on determining thickener capacities. Every mill man needing a knowledge of thickeners should have this volume. Circle No. 26.

NEW COLD GALVANIZING process is now available for distribution according to the Chemical Division of Galvicon Corp. The product known as Galvicon is applied by brush or spray method. It is said to combine with the base metal and actually galvanize it. It is further reported that in most cases the new coating actually outperforms the standard zinc coatings which are applied with heat. Circle No. 36 for more information.

THE MENLO FLUORETOR is a daylight fluorescence detector-comparator. The instrument is used for visually detecting and comparing the fluorescent reactions of substances and organisms which respond to irradiation with ultraviolet (blacklight). Portable models are powered by two readily changeable standard size flashlight battery cells. Circle No. 37.

RADIOACTIVE ANAMOLIES: A brochure describing instrumentation for aerial or ground surveying for radioactive materials is now available from Nuclear-Chicago. For additional details circle No. 38.

PORTABLE U_3O_8 ANALYSIS LAB: The Sherwin Instrument Company has designed a completely portable uranium analyses laboratory for use by both professional and amateur prospectors. Miners and prospectors can now get a fast, on the spot, anaylsis of ore samples. No chemical or mathematical training is necessary for users. The unit, housed in a compact carrying case, uses about 75 cents worth of material compared to a normal $10.00 fee for commercial assaying. Circle No. 40.

STEEL AND WOODEN TANKS: Denver Equipment Co. has available an informative catalog covering their line of tanks. The catalog is complete with specifications and prices, plus helpful hints on erecting wooden tanks and constructing wood tank foundations. Circle No. 32.

POWER TRANSMISSION equipment is highlighted in a brochure published by the American Pulley Company. Everything from wedgbelt drives, speed reduction drives, sheaves and pulleys to motor bases and shaft hangers are described. For your copy circle No. 24.

SURVEYING INSTRUMENTS: The Kern Instrument Company, manufacturer of levels and transits, is now offering precision optical surveying instruments for the mining industry. For more information on these Swiss made units circle No. 29.

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The Tirfor Griphoist A Portable Hoisting Unit

Griphoist, Inc. of San Francisco has placed on the market the Tirfor Griphoist, a versatile unit which will find many applications in industry.

The chief advantage of this machine is that it combines the desirable features of winches and all types of portable, chain-hoisting devices. Its lightweight, 42 pounds, permits it to be carried easily to places inaccessible to power winches. The unlimited cable travel, one of its outstanding features, allows cable of any length to be used. Circle No. 48 for information.

Sectional Belt Conveyor For Customer Assembly

The Stephens-Adamson Manufacturing Co. now offers a complete set of belt conveyor components pre-engineered for customer assembly. Units are designed for lengths up to 50-feet and from 51-feet through 100-feet in both 18 and 24-inch belt widths. Limiting capacity for 18-inch belts is 150 tons per hour and for 24-inch belts 250-tons per hour.

All conveyor components are available from stock and can be purchased as a package unit for a complete belt conveyor installation or as repair or replacement units on existing conveyors. For a copy of bulletin 1454 describing the unit in detail, circle No. 46.

New pH Instrumentation Systems for Control

Complete systems for pH recording and control, which incorporate for the first time the new Beckman Model W amplifier, have just been announced by The Bristol Company of Waterbury, Conn.

Bristol's new bulletin Q1304 gives full engineering specifications and illustrations of each component to the systems and shows methods of installing and a number of different applications. For your copy circle No. 45.

Two Giant Trucks Go Into Action On Iron Range

Two giant 50-ton dump trucks have been placed in service on the Iron Range.

The bodies and hydraulic hosits for the pair were designed and built by the Marion Metal Products Company of Marion, Ohio. The Marion body units were purchased by the Dart Truck Company of Kansas City, Mo., who mounted them on Dart Model 40-T trucks. The body is constructed of U. S. Tri-Ten E steel, and the truck is powered by two 275 horsepower engines. The hoist is designed to operate under normal operating pressures of 1,000 psi. A special feature of the trucks is the heated floor allowing operation in temperatures as low as 60 degrees below zero. For more information circle No. 47.

New Denver— Finney Belt Classifier

A new metallurgical development, the Denver-Finney Belt Classifier has been announced by the Denver Equipment Company. It is essentially a belt conveyor which is deeply troughed near one end to form a receptacle for a pool. Slimes overflow the pool portion of the belt, while sands are conveyed up an inclined segment of the conveyor to be reground.

Some of the advantages claimed for the unit are its quiet pool area at any mesh separation, ability to start under full load conditions, reduced maintenance, lower horsepower requirements, and its easy modification to handle corrosive pulps. For further information circle No. 42.

Notes From The Manufacturers

PAUL L. DAVIES, (left) president of Food Machinery & Chemical Corporation, San Jose, California, has been elected to the board of directors of Caterpillar Tractor Company. He replaces HARRY H. FAIR, who has resigned after 35 years of service with the firm. Mr. Davies has a broad background in business administration and has been president of Food Machinery since 1940.

John W. Gardner has been elected a director of the Gardner-Denver Company, manufacturer of quality compressors, pumps and rock drills. He has been with the firm since 1945 and in 1951 was assigned to its executive offices in Quincy, Illinois. Mr. Gardner is currently employed in the engineering development section.

Donald G. Ashe, formerly with The Cananea Consolidated Copper Company, Sonora, Mexico, has joined the engineering staff of The Allen-Sherman-Hoff Pump Company, Wynnewood, Pennsylvania. Mr. Ashe has had extensive experience in both pilot and actual plant operation and in his new job will be engaged in the application of sand pumps to mining throughout the world.

James Harold (Red)Lymburner, Canadian aviation executive, has been named sales manager of Canadian Aero Service Limited, Ottawa, Canada. The company is engaged in airborne magnetometer surveys for minerals, scintillation counter surveys, and aerial topographic mapping.

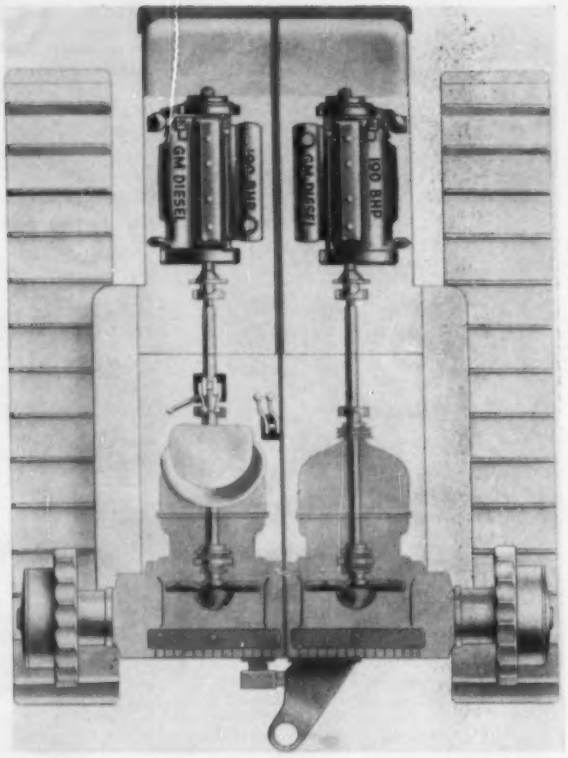
Emory M. Heuston, associated with the advertising department of Bucyrus-Erie Company for 25 years, has joined the Richard T. Brandt, Inc. advertising agency of Cleveland, Ohio.

H. Leon Moran, until recently factory manager for United States Rubber Company's Fort Wayne, Indiana plant, is the new products manager for the company's mechanical goods division. In his new position, Mr. Moran will be responsible for speeding the adoption and commercialization of new products. He will continue to make his headquarters in Fort Wayne.

RAY H. RODOLF has been named general manager of Le Roi Company's compressor division, moving up from the post of sales manager, construction and mining division, which he held for the past year. He is now working on the development of large stationary air compressors for use by the drilling industry, as part of Le Roi's program to better coordinate product development and research with sales and marketing. Mr. Rodolf has been with Le Roe since 1950 and has served as a West Coast representative and sales manager of the Cleveland, Ohio,

Euclid Presents

Revolutionary Twin Crawler



EUCLID'S TWIN TC-12 TRACTOR is shown in this simplified sketch to show how power from each engine is transmitted to a separate track through its own Torqmatic transmission.

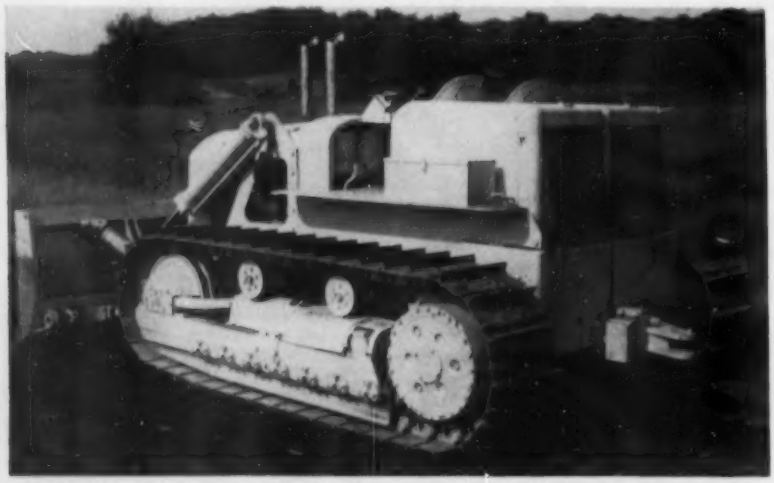
The world's most powerful tractor—the Euclid 380-horsepower TC-12 Twin Crawler—was previewed for MINING WORLD on September 16th at Milford, Michigan. This new twin-engined machine of revolutionary design is one of 20 units which are to be placed in field-test service on a 24-hour operating basis. It is anticipated that some units will be available for sale to the mining industry during the last half of 1955.

Why Twin Is Different

Utilizing twice the horsepower of tractors now in production, the Euclid tractor is powered by two 190-horsepower GM Diesel six-cylinder engines, each driving an Allison Torque Converter and Allison Torqmatic Transmission. Each drive train independently powers one track.

Two separate drive and track assemblies are free to oscillate on a seven inch transverse shaft. The two-section design gives flexibility over uneven ground. The tracks maintain good traction because each half of the tractor maintains better ground contact in rough terrain. A free movement of seven inches is limited by stops welded to each frame half. For applications where oscillation is not desirable, some of the tractors will be field tested with rigid mounting on the cross shaft.

The result of intensive study of crawler tractor requirements, the Euclid TC-12 experimental tractor is designed to provide higher power-to-weight ratios. Drawbar pull, equal to or better than current production crawlers, but at higher ground speeds, will give tractor ability for faster pusher loading of rubber-tired scrapers. Proving Ground tests indicate the TC-12 develops approximately twice the drawbar pull at 2½ miles per hour scraper loading speeds, compared to present 'big tractors." This loading speed matches the first gear speed of



ENGINES IN REAR are a feature of the new TC-12. Note how radiators are mounted so as to make operator's position free of dust and heat. Each track and drive assembly is free to oscillate so each track maintains better ground contact.

rubber-tired scrapers, for better, more efficient scraper loading.

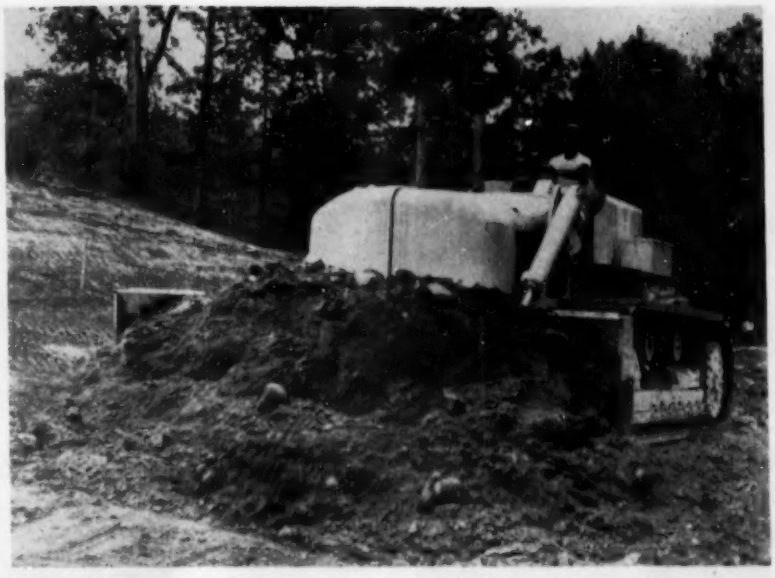
There are two transmissions, each with an integrally mounted torque converter. The crawler tractor transmission, made by GM's Allison Division, provides three speed ranges forward and three in reverse. All shifting is accomplished under full power. There is no master clutch. The tractor can be shifted from one speed range to the other, without loss of motion, and can be shifted into reverse while still going in the forward direction. The transmission provides adequate speed selections for all operating conditions. Top speed is eight miles per hour.

Fast Flexible Steering

The Twin Power arrangement permits a fast, flexible steering system, which increases workability. The Euclid tractor can be steered in several ways. It can be steered by increasing or decreasing the speed of one engine for gradual even change in direction; it can be steered by putting one transmission in neutral and applying a track brake; or rapid, sharp turns under full power can be made by putting one transmission in forward and the other transmission in reverse. The choice as to the method of steering assists the operator in shortening his cycle time.

Excellent accessibility is achieved for all components. The tractor can be dismantled and reassembled with ordinary servicemen's tools. The engines are mounted side-by-side, and drive through universal joints and drive shafts to the torque converter, which is located below and to the rear of the operator location. The converter, transmission, reduction gearing, and steering brake form one complete removable assembly. The reduction drive gears for each half of the tractor transmit power through an axle shaft to the sun pinion and the three-gear set of the Euclid planetary, located within the drive sprocket. The TC-12 can be almost completely dismantled without removal of the roller frames. This is unique in the industry and permits easy access to all of the final drive parts.

An experimental track tensioning device, based on hydraulic principles, is being tested on these machines. This is a part of the continuous efforts of Euclid engineers to achieve an improved crawler tractor design.



WORLD'S MOST POWERFUL tractor, the Euclid TC-12 with twin, 190-horsepower, GMC Diesel engines rolls a full load off its 13½-foot bulldozer blade at a special preview in September. Sales to mines are scheduled in last half of 1955.

Engines in Rear

The front hood cover of each tractor half is hinge-mounted to permit ready access to the engine. Two radiators are located to the rear in order to make the operator's position free of dust and objectionable heat. The radiators are hinged to rotate out of the way for access to the transmissions.

The four tractors displayed at Milford were equipped with a push plate for scraper loading, a hydraulically controlled 13½-foot bulldozer blade, a 17-foot 3-inch angledozer blade, and a pull yoke for a Euclid loader. A full complement of additional attachments is being planned, including cable-controlled type bulldozers.

The new crawler tractor line will be marketed through distributors of the Euclid Division in addition to present earthmoving equipment products.

Specifications—Euclid TC-12 Twin Crawler

HORSEPOWER: 380—Two GM model 6-71 Diesel engines

WEIGHT: 53,000 pounds approximate bare: 65,000 pounds with bulldozer and other attachments.

DRAWBAR PULL: Maximum drawbar pull almost equal to tractor weight with working accessories.

TRAVEL SPEED: 0 to 8.0 miles per hour, with three speeds.

ENGINE: 2 Detroit Diesel Model 6-71—190 horsepower each.

STARTING METHOD: Electrical starting.

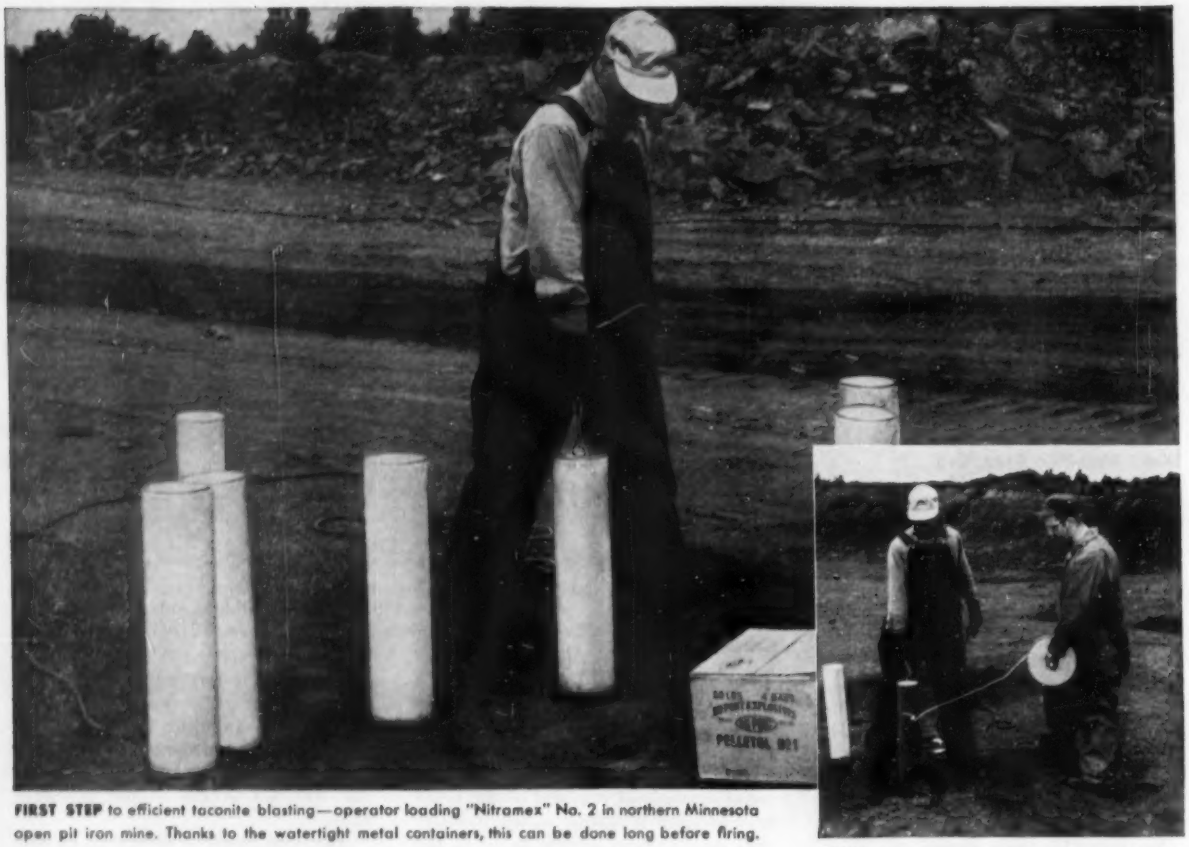
TRACK: Number of shoes (each side ..... 39)
Width of standard track shoe (..... 26 inches)
Height of grouser (measured from upper face of standard track shoe .... 2¾ inches)
Length of tracks on ground (center drive sprocket to center front idler ..... 115⅝ inches)
Area ground contact with track shoes (..... 6,000 square inches)

TRANSMISSION: Two Allison Torqmatic Drives, CRT-5530

STEERING: With engines, transmissions and brakes.

CLUTCH: None required.

GENERAL DIMENSIONS:
Length (Overall ..... 15 feet)
Width (Overall..... 11 feet 4 inches)
Height (Exclusive of the exhaust stacks ..... 8 feet)
Ground Pressure ..... (8¾ pounds per square inch, bare)



FIRST STEP to efficient taconite blasting—operator loading "Nitramex" No. 2 in northern Minnesota open pit iron mine. Thanks to the watertight metal containers, this can be done long before firing.

NEXT, "Nitramon" Primer is connected up with "Primacord," then lowered. This primer consistently sets off the charges . . . it's today's safest method!

Shooting taconite?

For better breakage, greater safety use DU PONT "NITRAMEX" No. 2

To take taconite shooting in stride and make each shot safer—use Du Pont Nitramex® No. 2 ammonium nitrate blasting agent. This hard-hitting product gives you the strength you need in tough formations to get excellent breakage. Just as important, built-in safety features minimize blasting hazards.

Fire, friction and sudden shock are no problem. "Nitramex" No. 2 can be detonated efficiently *only* by a "Nitramon" Primer, also relatively insensitive, and it does the job every time. Handling's safe and efficient, as neither contains nitroglycerin or is headache-producing. And you can load the charges weeks in advance of blasting. Sturdy metal cylinders protect them in wet holes, adverse weather. Another point customers appreciate: "Nitramex" No. 2 is absolutely non-freezing, assuring dependable shots whatever the temperature.

So test Du Pont "Nitramex" No. 2 in your own mining operation. You'll find it has the blasting power to handle tough rock . . . and provide an extra measure of safety on every job. For detailed information on this and all other members of the Du Pont ore-blasting "team," contact the Du Pont representative in your district. He'd like to be of service to you. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

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Consolidated Uranium Acquires Colorado Firms

Four Colorado uranium companies have been absorbed by Consolidated Uranium Mines, Inc., Salt Lake City, Salt Lake City company are Colorado Utah firm with extensive operations on the Colorado Plateau. Joining with the Uranium Mines, Inc., Three States Uranium Corporation, Paradox Uranium Mining Corporation, and Mesa Uranium Company, all with headquarters in Grand Junction. Stockholders in all companies will get one share of Consolidated stock for five shares from any of the absorbed firms. A total of $5,000,000 in Consolidated stocks will be thus distributed.

A. G. Frawley, president of Consolidated, also announced that his firm is buying the assets of Slagter Producing Company, Grand Junction, and is in the process of taking over mining operations for the company, which has properties south of Dove Creek in Dolores County, Colorado.

Both transactions will increase Consolidated's holdings to 85,000 acres. The firm expects more than $600,000 a month gross from its uranium, vanadium, and tungsten operations with the new capital and leases. Uranium activities for the company will be directed from an office in Grand Junction, employing 60 to 70 people. Men working at the mines of the absorbed companies have already been put on the Consolidated payroll.

United Park City Mines End 2½-Year Shutdown

Operations have resumed at the United Park City Mines Company's mine in Summit County, Utah after a 2½ year shutdown caused by low base metal prices. Rising lead and zinc prices, brought about by the government's accelerated stockpiling program, led directors of the firm to call for a resumption of operations. Lead now sells at 15 cents a pound and zinc at 11½ cents.

One hundred and ten men have been put on the payroll at the lead-zinc-silver mine, and a total of 200 is expected to be eventually employed. Ore production is estimated to reach 250 tons daily, although at first only limited development and exploration work will be carried out. S. K. Droubay is general manager.

The company was formed in May 1953 through merger of Silver King Coalition Mines Company and Park Utah Consolidated Mines Company.

Simplot Uranium Holdings Sold to Camoose Mines

The Montrose County, Colorado properties of J. R. Simplot Company of Boise, Idaho have been sold to Camoose Mines, Ltd. of Toronto, Canada for an undisclosed amount. The transaction includes all of the machinery and equipment at three operating mines, and 375 uranium mining claims in the Bull Canyon- Monogram Mesa area.

The three mines—Peanut and Gregor Nos. 1 and 2—have been in production for about a year. Their inclined shafts are large enough to drive 15-ton Diesel trucks underground for loading. Ore production figures are restricted by the United States Atomic Energy Commission, but the annual gross has been estimated as a multi-million dollar amount.

The Camoose firm has lead and zinc property in British Columbia where underground work is under way, as well as some uranium claims in Grand County, Utah. Reportedly it plans to triple present output from the Simplot property. Also it will assume the $88,770 DMEA loan which Simplot had been granted to explore the properties.

AEC Releases Report On Sampling Practices

A review of sampling procedures at major Colorado Plateau ore-buying stations has just been completed by the Colorado School of Mines Research Foundation, Inc. under contract with the United States Atomic Energy Commission. The review was actually a re-check of ore-sampling procedures, since an original survey was made by the organization in 1952 (See MINING WORLD, February 1953, Page 87; March 1953, Page 105).

Although deviations from accepted standards of good sampling still exist, procedures in the Colorado Plateau area are on a definitely higher plane than was the case in 1952, according to the report. This improvement is attributed to changes already planned by the various companies in 1952 and by a willingness on the part of the firms to accept the recommendations of the 1952 report.

Existing deviations probably follow an uneven pattern, favoring the buyer in one instance and the seller in another case, the report said. No evidences of intentional tampering with sampling devices or of irregularities with intent to deliberately defraud were disclosed.

Included in the inspection were the following: United States Vanadium Company, Riffe and Uravan, Colorado, and Thompson, Utah; Vanadium Corporation of America, Durango and Naturita, Colorado; Climax Uranium Company, Grand Junction, Colorado; Anaconda Copper Mining Company, Bluewater, New Mexico; and American Smelting & Refining Company, Monticello, Utah, Shiprock, New Mexico, and Edgemont, South Dakota.

Telluride to Enlarge Mill To 1,400-ton Capacity

Telluride Mines, Inc. at Telluride, Colorado, is planning enlargement of its 900-ton per-day differential lead-zinc-copper flotation mill to a 1,400-ton capacity.

This added capacity at its Pandora mill is to be achieved by addition of a primary rod mill, flotation cells, and rebuilding and re-equipping existing crushing facilities.

At the mine, studies are underway to determine the feasibility of lowering ore to the Mill Level cross cut as a means of overcoming difficulties inherent with wet ore passes.

Telluride was purchased by Idarado Mining Company, subsidiary of Newmont Mining Corporation, in 1953. Low base metal prices shut the mill down in April 1954, and since that time a limited development and maintenance crew has been retained at the mine. Estimated cost of the entire mine-mill program is $1,000,000.

Sateco Ships First Ore; Sells Leases to Vitro

Purchase of Sateco Uranium Company leases, including the Gunnell claims in Wyoming's Gas Hills area from which ore shipments have already been made, has been announced by the Vitro Uranium Company of Salt Lake City, Utah. Cash price of the sale was not disclosed, but it is believed to be in excess of $100,000.

Fifty seven claims are involved in the transaction. A 16⅔-ton truckload of ore was recently shipped from one of the properties, the Gunnel claims, to the Climax Uranium Company in Grand Junction, Colorado. Assaying 0.4 per cent U_3O_8, the shipment reportedly brought $1,100.

Vitro plans to take over complete control of operations at the property. Extensive drilling programs are being planned, starting on the Gunnell claims and eventually covering all of the leases purchased. Rochester-Pittsburg Coal Company will handle actual mining at the operation, and Vitro will conduct the milling, exploration, and technical operations. Vitro is operator of a Salt Lake City mill which has been processing ore from Colorado and Utah for several years, but this is the firm's first venture into Wyoming.

Included in the Sateco-Vitro transaction were the following: 14 Gunnell and 11 Ver claims held by Fremont Mining and Metals Company, Lander; 14 claims comprising the John and George groups held by John and George Snyder, Lander; 8 Gem claims owned by Myrna Wade; 10 Ono claims owned by Wyoming Mica and Metals Company, Lander.

Climax Molybdenum Company, Climax, Colorado set an all-time daily production record of 32,365 tons in September. Phillipson level production was 20,890 tons and Storke Level was 11,675 tons. Climax is the largest underground mine in the United States, with a 1953 tonnage mined at 6,604,857.

Leonard Construction Company, Monsanto Chemical Company subsidiary, has been contracted to design the $1,500,000 sulphuric acid plant for *Rico Argentine Mining Company* at Rico, Colorado. Excavations for the plant are now underway. Lead-zinc mill tailing will be refloated to produce pyrite for acid plant feed. Afetr tailing is depleted reduction will begin on 25,000,000 tons of pyrite ore reserves. Daily production will be 100 to 200 tons of sulphuric acid. (See MINING WORLD, August 1954, page 79.)

The *Kathy Jo Mining Company*, Gunnison, Colorado, has leased several of its uranium claims to Fred Abrahamson and associates, Colorado Springs. Sixty thousand dollars were reportedly paid for the claims, which were located 600 feet from the *Los Ocho* group on Cochetopa Creek.

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Owners of the Kathy Jo are Allen Hart, Gene Mitchell, Paul Hart, Orville Kimball, and Jim Sivola.

United States Tungsten Company has sold its Gold Hill property, near Gunnison, Colorado, to *Flanders Mining Company*, Grand Junction, and *Whitaker-Bigelow & Company*. An exploration program is planned for the near future and may include reopening of the *Ida May* shaft for possible gold and tungsten recovery.

Early in September *Dodge Uranium Corporation*, Denver, Colorado, moved $16,000 worth of mining equipment to its operating mines on Outlaw Mesa in the Gateway area of Mesa County. The firm owns the eight *Jody* claims at that location. According to president Sumner D. Dodge, his company has uncovered some ore containing 5.0 percent U_3O_8. He soon plans to be shipping 20 tons per day to the *United States Vanadium Company* mill at Uravan. Dodge Uranium is reportedly in the process of acquiring two additional properties in the same area.

Recent filings of uranium companies at the Denver, Colorado regional office of the security and exchange commission include the following: *American Uranium*, Moab, Utah, John Parsons, president; *Four-States Uranium Corporation*, Grand Junction, Colorado; *Foutz Uranium Mining Company, Inc.*, Albuquerque, New Mexico; *New-Mar Uranium Corporation*, Denver.

Minerals Exploration Research Corporation, a consulting and contracting firm, has opened district offices in Grand Junction, Colorado. Fred C. Hohne, partner in the company, will direct the office. Headquarters for the firm are in Golden, Colorado.

UTAH

Eimco Corporation, Salt Lake City, Utah, has been licensed to manufacture the Burwell filter developed by Blair Burwell, president of *Minerals Engineering Company*, Grand Junction, Colorado. The filter, used in recovering metals from low grade ores and concentrates, has been described as "revolutionary" in the mining industry. Eimco officials believe that the new filter will receive substantial acceptance in uranium reduction mills of the Colorado Plateau.

Construction of a $500,000 mill at Sulphurdale, Utah, has been scheduled by the *American Sulphur & Refining Company*, Beverly Hills, California. Drilling on sulphur properties near the proposed site of the mill, which have been leased by the firm, has disclosed proved reserves of 3,000,000 tons of 25 percent sulphur-bearing conglomerate rock.

Sale of 26 claims in Utah's Rattlesnake Mountain area and the formation of *Luckytex Uranium Company* have been announced by the *Old Texas Mining Company* of Dallas, Texas. The claims include property located four miles northeast of Charles Steen's *Mi Vida* mine. Mining operations are now being conducted by *Minerals Engineering Company*, Grand Junction, Colorado.

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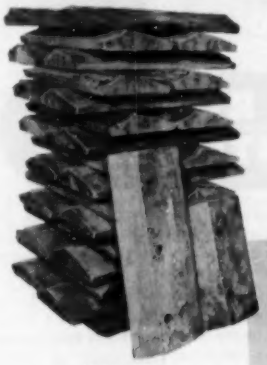

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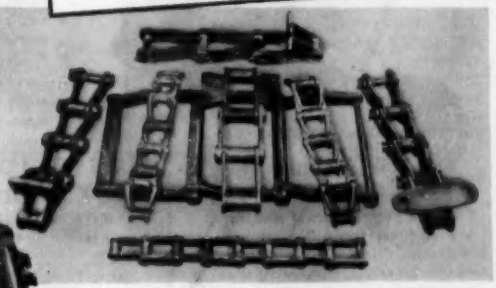

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Ore is being stockpiled, and no decision regarding its treatment is planned for several months. Purchasers of the group were a Chicago, Illinois group, headed by Gerald Gidwitz, chairman of Helene Curtis Industries, well-known cosmetic manufacturer. The newly-formed Luckytex group has options on several claims in the Rattlesnake area and in Grand County.

Silver Buckle Mining Company, Wallace, Idaho, recently started drilling its *Mountain Lion* claims in the Big Indian Wash area, San Juan County, Utah. The work is directed by Richard Teichman, chief geologist for *Cal Uranium Company*. Silver Buckle has acquired an interest in *Lucky Mac Uranium Corporation*, with uranium holdings east of Riverton, Fremont County, Wyoming. It has assigned a 640-acre state lease in Utah to Lucky Mac. Clark Wilson, Salt Lake City, is Silver Buckle vice president.

National Uranium Company, Wallace, Idaho, has entered into a lease and profit-sharing agreement with *Silver Buckle Mining Company* to drill the latter's *Joan*, *Sawtooth* and *Lamm* claim groups in the Big Indian Wash area, San Juan County, Utah.

A major drilling program is scheduled for the near future by *Pan-American Uranium Corporation* of Houston, Texas, on its properties in the Red Canyon region of Utah. Pan-American and M. A. S. Makris, Houston financier and industrialist, have signed a $500,000 core drilling contract with *Steward Uranium Drilling Company*, Monticello, Utah. In September Mr. Makris announced a large uranium strike on the property. Geologists have reported a large body of Shinarump with high uranium content. The body is believed to be about one mile wide with a depth of from 30 to 50 feet.

Cornucopia Gold Mines, Spokane, Washington, has entered the uranium field by leasing 159 mining claims in Utah's Emery and Wayne Counties. Limited surface exploration work has exposed uranium-bearing formations, according to Carl M. Stolle, president. Norman E. Ebbley, Grand Junction mining geologist, will act as consulting engineer for the company. Another former gold producer, *Consolidated Virginia Mining Corporation*, Virginia City, Nevada, has obtained 120 uranium claims at Temple Mountain, Hite, and Green River, Utah. The company mined on the famous Comstock Lode in Nevada for many years.

WYOMING

Green River Uranium Company, Fremont County, Wyoming, expects to begin regular shipments of uranium ore as soon as preparatory work at the company's operations in eastern Fremont County is completed. The firm is completing erection of loading ramps at its railroad siding in Lysite, Wyoming. Claims recently leased by the company include the *Bart*, *Hal*, *Eagle*, and *Skoal* groups in the Gas Hills area.

Roaring Creek Mining Company, Kemmerer, Wyoming, has incorporated with 50,000 shares of no-par value common stock.

Piquette Building Mill At Wisconsin Property

Construction of a 300-ton gravity-flotation mill has been started by the Piquette Mining & Milling Company of Platteville, Wisconsin at the firm's Tennyson ore body located 15 miles west of Platteville. Completion is expected early in 1955.

The topography of the land is such that it was possible to open up the zinc-lead ore body with a 300-foot adit driven on a plus 0.5 percent grade. In addition to haulage advantages, the plus grade will also serve to dewater the mine by gravity. Drifts and crosscuts have been driven in the ore body to check the results of the exploration drilling. Mining will be carried on through the adit using off-track equipment and the room and pillar method of mining common to that area.

Probably the first uranium leases to be filed in North Dakota were those recorded with the Billings County register of deeds at Medora, North Dakota. J. N. (Bud) Ray, chief of exploration for the *Wyoming Uranium Company* of Cody, Wyoming, made the filing. The property covers 40 acres and is about eight miles south and a little east of Medora. Airborne prospecting was followed by surface and core drilling, and chemical samples are now being assayed by two Cody firms.

The Batesville, Arkansas chamber of commerce has set itself three objectives in an effort to increase manganese production in the Cushman-Pfeiffer area. These are: to secure a full-time resident manganese inspector; to change the assay specifications by lowering the marketable manganese content from 40 to 35 percent, and raising the allowable phosphorous content from 0.3 to 0.5 percent; and to establish an assay laboratory in Batesville. It is believed that if the assay specifications could be changed as proposed, manganese production in the area could be doubled. The full-time inspector is considered necessary to speed up the shipments from the area.

The *Ozark-Mahoning Company* has resumed operations at two of its fluorspar mines in Hardin County, Illinois. The mines had been operated by independent contractors before they were closed in July; under a new policy the company will operate the mines now.

During the first 24 months of its operation, the *U.S. Mica Purchasing Depot* at Spruce Pine, North Carolina bought $3,468,722.10 worth of accepted grades of strategic mica for the government stockpile. This was at an average rate of $148,667 a month. Purchases have continued to increase each month recently, with June purchases at $193,169.59; July $187,229; and August $165,627.74. This includes all grades of ruby and nonruby bought. The depot is reported to have purchased more than 70 percent of all domestic mica bought by the government under the stockpiling program, and 90 percent of this came from the North Carolina mines, mainly in the Spruce Pine area.

A new firm, *Nuclear Science and Engineering Corporation*, has been formed to furnish technical services to concerns engaged in nuclear power development or interested in the industrial applications of radioactivity. Headquarters are in Pittsburgh, Pennsylvania, and Gordon Dean, former chairman of the U.S. Atomic Energy Commission, is chairman of the board. Ronald A. Brightsen, formerly with the atomic energy division of Westinghouse Electric Corporation, is president.

The national search for uranium ore has reached Morganton, Burke County, North Carolina where a growing list of prospectors are filing requests for land leases in the Daniel Boone Wildlife Management area, and in surounding parts of the county. Among the claimants are Clarence Shatley and Blair Bard of Ashe County for 550 acres; Oliver T. Webb and Commodore V. Burleson for 42 acres; Paul Shatley and Charles Cox for 371 acres; B. B. Frye and Robert McRee; C. R. Rominger and George W. Ward; LeRoy Rose and Reed Barrier; Douglas B. Johnson, Herman C. Hall, and Walter A. Slade.

Production at *International Minerals & Chemical Corporation's* three Florida phosphate mining properties increased in August and favorable mining conditions anticipated for September were expected to keep production high during that month, too. The combined production of the *Noralyn*, *Peace Valley*, and *Achan* also exceeded budgeted tonnage figures in August.

Blue Ridge Mica Company, with headquarters in Greensboro, North Carolina, is reported to have leased the mineral rights to 400 acres of the Bailey property near Penland, North Carolina, and to be considering the erection of a 1,000-ton-per-month dry mica processing plant there. About $100,000 would be needed for the project, $80,000 of which would be for the construction of the mill, and the remainder as working capital.

Kennecott Copper Corporation has provided two graduate fellowships in Harvard University for students interested in the extractive and metal-using industries. One fellowship will support the work of an advanced student in economic geology; the other will support a student in the Graduate School of Business Administration. Each carries a $2,000 stipend. In addition, the company will pay an equal amount to the University.

Bessemer City, North Carolina is the scene of great lithium activity these days. *Lithium Corporation of America* is developing a $7,000,000 project. Mining

Oliver Ships First Iron Ore from Plummer Mine

The first iron ore concentrate from Oliver Iron Mining Division's new Plummer open-pit mine and beneficiation plant near Taconite, Minnesota, has been shipped after more than two years of development and construction work. E. A. Friedman, general superintendent of the Canisteo district, and Wayne Beebe, mine superintendent, are shown placing the traditional pine tree atop the first carload. This is the U.S. Steel division's sixth beneficiation plant and will be able to produce 1,200,000 tons of iron concentrate annually. Development of the mine began in 1952 when the work of stripping about 3,600,000 tons of overburden was started. In May 1953, construction of the washing plant and accessory facilities started. In addition, the completed installation includes the latest in crushing, screening, and conveyor systems, shop, office, garage, change house, and complete open-pit mine equipment. Mining operations utilize power shovels and heavy duty trucks. The ore is loaded into the trucks and hauled to a screening pocket in the pit. From the pocket, a belt conveyor transports the ore up to the edge of the mine where the plant is located.

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operations have already begun and the new flotation plant will be in production on or before January 1, 1955. *Foote Mineral Company* has a plant expansion program almost completed at nearby Kings Mountain; *Kawecki Chemical Company* has leased mineral rights to several thousand acres between Cherryville and Lincolnton, and reportedly will construct a processing plant. *Gaston Chemical Company* is active in Gastonia.

New Jersey Zinc Company has closed its zinc mine at Franklin, New Jersey after depletion of the ore body. The mine has been in operation since 1848. About 400 workers were employed in the mine and plant at Franklin. Some will be transferred to the company's zinc operation at Ogdensburg, New Jersey.

The New York Office of the *United States Atomic Energy Commission's* division of raw materials has been transferred to Washington, D.C. Dr. Phillip L. Merritt, assistant director for exploration in the New York division, will continue in this position in Washington.

Robert Tysinger and Roy Reynolds, working in a mine near Star, Montgomery County, North Carolina, are reported to have struck gold-bearing quartz. Mr. Tysinger calls it a "stringer" and predicts discovery of a larger vein within another 10 feet of mining.

The *E. C. Schroeder Company, Inc.* of McGregor, Iowa, is reported to be producing 100,000 tons of iron ore annually on its property in Russellville, Alabama. The ore is shipped to the *U.S. Pipe & Foundry Company* plant at Birmingham.

The Polk County, Florida commissioners have voted not to allow leasing of mining rights in the bottoms of Lake Pierce, Lake Hancock, and Lake Weohyakapa, and have requested trustees of the State Internal Improvement Fund not to lease any fresh water lakes in the county for phosphate mining.

IRON RANGES

As of October 1, 50,606,528 gross tons of iron ore had been shipped from ports in the Lake Superior region, according to reports from the Lake Superior Iron Ore Association. In 1953 80,005,626 tons had been shipped by the same date.

Based on tests made at the Babbitt plant, the *Reserve Mining Company* has decided to use grate-type furnaces rather than the shaft type for hardening of pellets at the new Davis Works. A contract has been let to the Arthur G. McKee Company of Cleveland for the new pelletizing plant. Total cost is estimated at $19,000,000.

Oliver Iron Mining Division of *United States Steel Corporation* has awarded a contract to *The Associated Builders* of Virginia, Minnesota for the construction of a new heavy media and cyclone plant at the *Gross Marble* mine near Calumet, Minnesota. Work on the new plant is to start at once with production scheduled for late in 1955. The plant will consist of two heavy media and two cyclone sections.

Pickands Mather & Co. will add a heavy media section to its present washing and jig plant at the *Danube* mine this winter. Production is scheduled for the beginning of the 1955 season. The new plans call for handling the plus 3/16 inch in the HMS plant and the minus 3/16 inch in the jigs.

Climax Molybdenum Company will spend $250,000 to expand its research facilities in Detroit, Michigan. A modern building adjacent to the present Climax laboratories has been purchased from the *Gorham Tool Company*. The expanded molybdenum chemical program will be devoted mainly to research in Moly-sulfide.

Newest shipping center on the Great Lakes is Port Dolomite which next spring will become the shipping point for about 3,000,000 tons of high-grade dolomite limestone annually. Naming of the port was announced by Hugh S. Lewis, president of Michigan Limestone Division of the *United States Steel Corporation* which expects to open its new dolomite quarries and complete construction of processing plants on the Upper Michigan Peninsula in the fall. The new port is located between McKay and Bush Bay on Lake Huron. A primary crusher is being erected on the floor of the quarry. The stone will be hauled from the crusher, over a new railroad, to the port where a secondary and tertiary crusher and screening plant of about 1,800 tons per hour capacity will process the stone into eight grades. A traveling loading shuttle on the 620-foot-long dock will enable a boat to be loaded in about five hours with various sizes of limestone.

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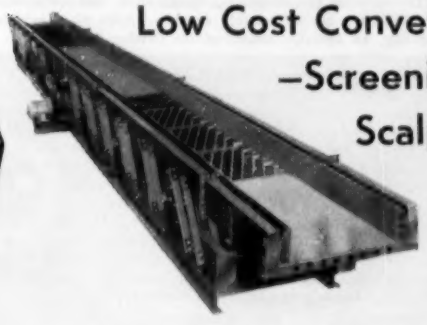

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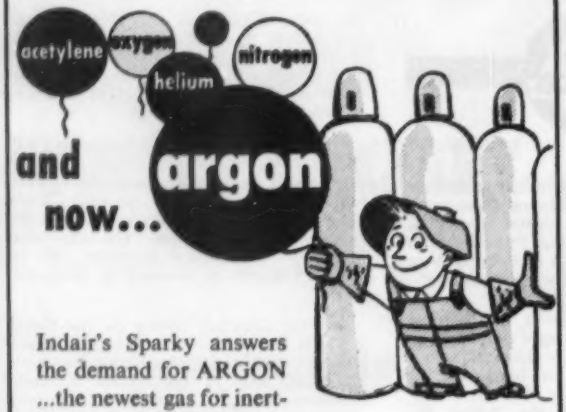

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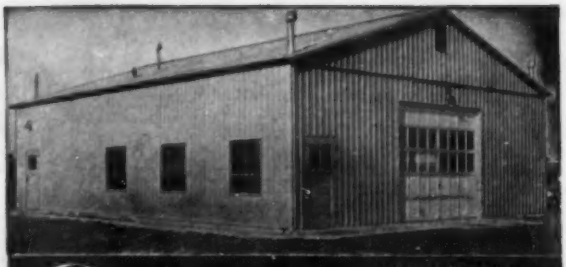

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Statement required by the Act of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of MINING WORLD published monthly except in April when publication is semi-monthly, at Bristol, Connecticut for October 1, 1954.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher—Miller Freeman, 121 Second Street, San Francisco 5, California; Editor—George O. Argall, Jr., 121 Second Street, San Francisco 5, California; Managing Editor—None; General Manager—Wm. B. Freeman, 121 Second Street, San Francisco 5, California; Business Manager—Max F. Holsinger, 121 Second Street, San Francisco 5, California.

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3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

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Northwest Convention Set For Spokane December 3rd

The 60th annual convention of the Northwest Mining Association will be on December 3 and 4 in Spokane, Washington, according to Karl W. Jasper, president. The Davenport Hotel will be convention headquarters as mining men from the pacific northwest and British Columbia gather as they have every year since 1894.

Spokane Indians Find Uranium in Washington

What may prove to be the first commercial uranium deposit in Washington state has been uncovered on the Spokane Indian reservation in southern Stevens County, 60 miles northwest of Spokane.

Governmental agencies have identified both automite and torbernite, the latter concentrated along points of weathered argillite above a granite contact. Samples of argillite have averaged 0.48 percent uranium oxide.

At last report, about 3,000 tons of the material had been uncovered by bulldozer, with 20 tons being classified as ready for shipment. Beneficiation tests had not been completed.

The discovery was made by two members of the Spokane tribe of Indians, John and James LeBret, prospecting at night with ultraviolet lamps. They traced the radioactive zone for 1¾ miles in length.

With Clair, John, Edward, and Thomas Wynecoop, the LeBrets have formed Midnight Mines to develop the showing. Clair Wynecoop is general manager. The six members of the Spokane tribe have been granted a mining lease on 570 acres of tribal lands from the bureau of Indian affairs.

The Spokane tribe will receive royalties ranging from 10 to 20 percent on ore shipped. Prospecting on the reservation is by permit only and permits are being granted only to members of the tribe.

Primitive Exploration and Finding Company of Hailey, Idaho has attained a depth of more than 40 feet on a vein of uranium-bearing ore. A contract has been let to sink a new 120-foot shaft and work is under way. An examination has revealed that fine-grained uraninite is associated with galena and pyrite.

Milling grade silver-copper-lead ore has been found in diamond drilling at the westerly end of the Chester vein structure in *Chester Mining Company's* holdings in Shoshone County's silver belt. Diamond drilling from an exploration drift driven from the 3,000-foot level of the *Silver Summit* mine had indicated a possible short ore shoot at last report. *Polaris Mining Company* controls Chester and is the operating firm. L. J. Randall of Wallace is president of both firms.

Salmon River Scheelite Corporation is preparing to carry on underground mining throughout the winter at its Thompson Creek operations above Clayton, Custer County, Idaho. Tungsten ore extracted in open-pit operations during the summer was shipped to the Schmittroth-Etherton mill at the *Big It* tungsten property on Trapper Creek, west of Kellogg, Shoshone County. Clinton Gunderson and Jim Clutis of Salmon, and Robert W. Faris of Arco are associated in the venture.

Park Copper and Gold Mining Company of Wallace, Idaho has constructed a two-mile road to its property south of Mullan, Shoshone County, and at last report was reopening tunnels caved for many years. The United States Geological Survey planned to examine the workings. The company has increased its capitalization and modernized its by-laws. J. B. Benedict of Wallace is secretary.

Triumph Mining Company has been granted a $71,677 DMEA loan for a $143,354 lead-zinc exploration project at its *Triumph* mine near Hailey, Blaine County, Idaho. Crosscutting, drifting, and raising are provided for in the two-year contract. L. M. Robinson is general manager.

United Uranium Company at Boise, Idaho is planning extensive exploration of its 1,000-acre state lease in the Rock Creek area, southeast of Hailey, Blaine County. J. W. Melrose, Spokane geologist, is making a geological survey of the tract which is near ground tested by the U. S. Bureau of Mines in the past summer. David Callender of Boise heads the company.

Ivor Anderson of Clark Fork, Idaho is mining ore from the South ore body of the *Whitedelf* mine, Bonner County, under a leasing arrangement with *Whitedelf Mining and Development Company*. High-grade is being shipped to the Bunker Hill smelter at Kellogg. His operations are above the 400 level. The company is driving a 1,120-foot tunnel toward the ore body from the mine's new 800-foot level. Work is under a $69,000 extension of a $120,250 DMEA project which has included deepening of the shaft 400 feet and opening of the main North ore body at the lower level. Compton I. White of Clark Fork is secretary-treasurer of the firm.

Sidney Mining Company of Kellogg, Idaho is starting a new $323,150 DMEA project at its Pine Creek district property, Shoshone County. The main Sidney shaft will be deepened 600 feet to the 2,300-foot level and that deeper horizon explored by 4,075 feet of drifting and 12,000 feet of diamond drilling. The firm has carried out a $200,290 DMEA project in upper levels of its zinc-lead producer. M. C. Brown is company president.

A vein of copper-gold ore and a vein carrying values in mercury have been opened by open-cutting at the Mike Carney mining property on the south fork of the Clearwater river, 11 miles southeast of Grangeville, Idaho. Both veins also show some radioactivity.

Bunker Hill & Sullivan Mining and Concentrating Company has sued *Aberdeen-Idaho Mining Company* to quiet title to the *Bobcat* and *Gopher* claims east of Kellogg, Idaho. The defendent is seeking to patent a number of claims in the area.

Hayden Hill Consolidated Mining Company is considering entry into the uranium field. The firm's holdings in the Coeur d'Alene mining region of northern Idaho are under long-term lease to *Silver Dollar Mining Company*. W. T. Anderson of Spokane is president.

A federal court judge in Boise, Idaho has ruled that the government must reimburse *Sullivan Mining Company* of Wallace for expenses of $54,864 in constructing bins for stockpiling of government-owned zinc at its electrolytic zinc plant near Kellogg, Shoshone County.

Vindicator Project Making Rapid Progress

This is the surface plant at the property of Vindicator Silver-Lead Company, east of Mullan, Idaho, scene of one of the Coeur d'Alene mining region's newest shaft sinking projects. Silver Buckle Mining Company of Wallace, Idaho and New Park Mining Company of Salt Lake City, Utah are doing the work under a profit-sharing agreement. The project includes rehabilitation of the Vindicator tunnel, cutting of a shaft station, sinking of an 800-foot shaft, and establishing of a level at 750 feet to prospect the Vindicator fissure at depth. The fissure zone has been intersected by the Vindicator tunnel and gives every appearance of being favorably mineralized with expectation of ore at depth. The shaft was down 600 feet by the middle of September. A joint company-DMEA contract totaling $229,500 is financing the project.

J. R. Simplot Company has resumed production of barite at its open-pit operation on Deer Creek in Blaine County, Idaho. About 40,000 tons of barite will be shipped to the Simplot crushing and grinding plant at Pocatello.

The *Mother Lode Trust* of Ketchum, Idaho is leasing the *Parker* mine, located two miles south of Sun Valley, Idaho. They report that they have recently found ore assaying 76 percent lead and 247 ounces in silver. Bulldozing has exposed the vein for about 300 feet and uncovered the ore showing for 10 feet. The Parker was an early day producer of silver and lead ore. There are 4,000 feet of tunnel work on the property, and milling grade ores are available in the old workings, says Heber Comer, trustee, who owns controlling interest. Diamond drilling will be conducted to lower depths.

The Defense Minerals Exploration Administration has approved a $128,320 underground exploration program at the *Scratch All* manganese-lead-zinc mine, Philipsburg mining district, Granite County, Montana. Government participation will be $80,200. The loan is being made to Peter Antonioli of Butte.

Radioactivity has been found in the carbonaceous shale and tactites of Granite County's Philipsburg area of Montana. At last report samples were being analyzed in Washington, D.C. Ten mining claims have been staked by Robert A. Little, George T. Croonenberghs, and Roger F. Little and exploration is under way. These claims adjoin the *Brooklyn* mine owned by *Black & White Mining Company*, of which Roger F. Little is company president.

Articles of incorporation have been filed at Helena, Montana by the following companies: *Treasure Mines and Oils, Inc.*—directors, Fred and Georgia Briggs, Pete Decker, A. R. Moore, and E. K. Cheadle, all of Billings; *Little Rockies Mining and Development Company*—directors, Frank B. Bryant, Edward F. Wieglandad, Juanita Heller, and Marion Heller, all of Landusky, and Cecil Flinders of Lewiston; *Needlegun Mine*—directors, W. R. McLure, Philipsburg, Thomas C. Colton, Billings, Lownes Maury, Butte, James C. Carey, Joliet, Illinois, and Elizabeth Colton of Billings.

Sanford R. and Vivian H. Davis of Boulder, Montana and Clyde R. Davis of Billings have incorporated *Square Deal Uranium Company* of Boulder. Capitalization was listed at $150,000.

Total tonnage of chromite purchased by the government at its Grants Pass, Oregon purchase depot up to June 30, 1954 was reported to be 60,479 gross dry tons. In June the depot received 3,303 short tons or 2,946 long tons, 2,196 tons of which came from California and 1,107 tons from Oregon.

Claiming a uranium discovery in an old mine shaft, a group headed by Norris Poulson, mayor of Los Angeles, has filed on 20 claims near the source of the Imnaha River in Whitman national forest, northeastern Oregon. Mr. Poulson is a former Baker resident. His associates include Frye Herbert, his administrative assistant, and Vivian Kennedy, Baker farmer.

L. L. Hassler of Kerby, Oregon and Donald M. Hassler of Cave Junction are developing the *Dark Star* chrome property in western Josephine County near the *Chrome King* mine. About eight tons of massive chromite assaying about 50 percent Cr_2O_3 and 11 percent Fe have been mined.

Radioactivity has been found in pegmatite deposits of the Sherman Pass area east of Republic, Ferry County, Washington. Fifty-five claims were filed at Republic in a two-week period. The United States geological survey collected samples for analysis.

Olivine is being mined in the Twin Sisters Mountains, 20 miles north of Hamilton, Skagit County, Washington by *Scheel Olivine, Inc.* of Mount Vernon. The olivine, composed of closely fused fayalite and fosterite, with 10 percent iron content, is treated in a recently completed crushing and screening plant at Hamilton. Initial sales efforts will be concentrated on the foundry and refractory trades. Company officials claim the Washington deposits of olivine are the largest and best in the world. H. P. Scheel of Sedro-Woolley is president and Walter E. Bergstrom, Mount Vernon, vice president and general manager.

Thoro-tungstite, along with small amounts of cerium and zirconium, have been found in wolframite tungsten concentrates being milled at the old *Germania* mine in southwestern Stevens County, Washington by *Penticton Tungsten Mines, Ltd.* The minerals were identified as a result of a Geiger counter test of the concentrates which showed radioactivity. A second Diesel-electric generator has been installed to permit three-shift operations of the mill on open-pit ore.

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Mines Reopen, Three Largest Producers Expand as Mercury Price At All Time High

The three major domestic mercury producers are making plans to increase their output as soon as possible. Record breaking price, $325.00 per 76 pound flask, is the reason for this expansion. Here is what each of these three producers is doing:

Cordero Mining Company is maintaining production at 400 flasks per month at its Cordero mine at McDermott, Nevada while its geologists are examining other properties which may warrant operations. The company has leased Bradley Mining Company's Reed mine in Lake County, California and plans exploration work. During World War II Bradley operated the mine and closed it down when the price fell in 1945. The mine was dewatered and clean up operations started in 1951 by Bradley.

The New Idria Mining and Chemical Company has expanded both mining and furnacing operations in recent months, at its New Idria mine in San Benito County, California. Monthly output is to be increased above 500 flasks. For the year ended June 30 it was 4,911. Three furnaces are in operation and the fourth is being repaired. Two of the furnaces are being modernized. Mine production is about 4,000 tons of ore per month which is mined at West Idria and the C-stope. Exploration aided by a DMEA loan has disclosed mineralization in a new section of the mine on the fifth and 10th levels.

In addition to furnacing its own ore, New Idria is treating ore mined from open pits by Louis Knepper at the North Star and Anita mines. Also in the New Idria district several small retort plants are operated at the Juniper Lone Oak, and Valley View mines.

Sonoma Quicksilver Mines, Inc. is producing about 250 flasks per month at its Mt. Jackson mine near Guerneville, California. The two kilns are furnacing ore stoped from the mine's 875- and 975-foot levels. The company is opening a new mine northeast of Winnemucca, Nevada, and a furnace and other surface installations are now being constructed. Production is scheduled near the first of the year.

Another California producer is California Quicksilver Mines, Inc. which is operating the Abbott mine 25 miles west of Williams, California. A new furnace is being installed which will double daily ore tonnage to 80, permitting monthly output of 300 flasks.

In Oregon, the Bonanza Oil & Mine Corporation reopened its closed Bonanza mine at Sutherlin in June. Production is to be increased to 120 flasks per month as soon as an old furnace is rebuilt and placed in operation.

United Mercury Mines Company has reopened its underground Hermes mine northeast of Cascade, Idaho. A 150-ton rotary furnace at the property can furnace additional mine ore. Recent production has been about 100 flasks per month.

Buckman Laboratories, Inc. is operating the Buckman, Cloverdale, and Abbott mines near Cloverdale, California. Both open-pit and underground mining methods are used.

The U. S. Bureau of Mines has reported the following domestic (includes Alaska) mine production of mercury by quarters: In 1953—January-March 3,500 flasks; April-June 3,790; July-September 3,040; October-December 3,970. In 1954—January-March 4,170; April-June 4,700.

Calif. Uranium Property Sold for $1,000,000

The 400-acre uranium claim in the Kern River Canyon near Miracle Hot Springs, California has been sold to an Eastern firm for $1,000,000. Officials of the Miracle Mining Company who share in the sale are Henry Brooks Mann, president; Joe Mann; G. H. Kilmer; Don and Roy Bartlett; and Chris Musick.

The purchasing firm, whose name has not been disclosed, was represented by William Ditto. The Bakersfield law firm of Borton, Petrini, Contron & Borton represented the owners in negotiations. The transaction calls for a down payment of $35,000 and a 12 percent share in the gross profits until the sum of $1,000,000 has been reached.

Miracle Mining Company made local history a few months ago when it shipped Kern County's first carload of uranium ore (45 tons) to the Vitio Uranium Company at Salt Lake City, Utah for processing.

This ore was mined from a 240-foot adit driven along a northwest trending fracture zone in biotite-hornblende quartz diorite. The uranium-bearing minerals are principally autunite and torbernite. They are localized discontinuously along the fracture zone and are in highest concentrations at the intersections of fractures.

Santa Fe Railroad Expands Southwest Uranium Hunt

The Atchison Topeka and Santa Fe Railroad Company is expanding its search for uranium deposits on the hundreds of thousands of acres of land which it owns adjacent to its rights of way in New Mexico, Arizona, and California.

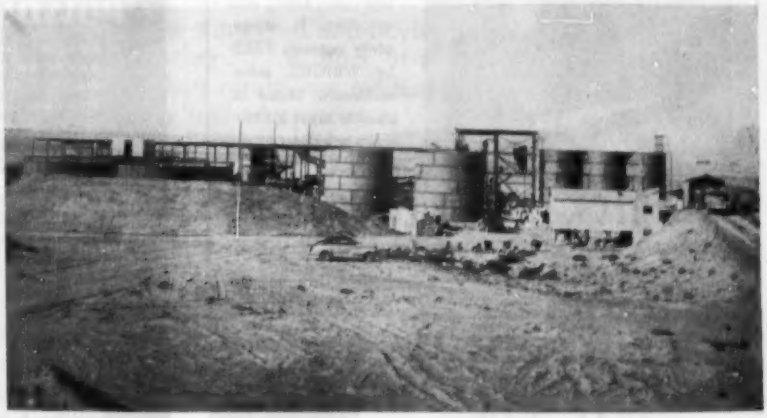
The search program will be under the direction of Tom Evans, Santa Fe mining engineer, who also directs operations at the railroad company's mining subsidiary —Haystack Mountain Development Company at Prewitt, New Mexico. See pages 50 to 53 of the October 1954 issue of MINING WORLD for a report on Haystack's operations.

Initially the program calls for airborne scintillation surveys from a helicopter with ground checking by an expanded force of field geologists.

New Idria Expanding Mercury Production

New Idria Mining and Chemical Company has signed a contract with the Defense Minerals Exploration Administration for an exploration program to search for additional mercury ore bodies near its New Idria mine in San Benito County, California. The company's mine production in the year ended June 30, was 4,911 flasks—an increase of 58 percent over last year. Output will be raised from 500 flasks monthly to about 600 flasks monthly.

New Idria has recently formed a new division to manage and operate mines for other companies. The division reportedly will operate uranium and manganese mines owned by other individuals and corporations and provide the neces-



$3,000,000 Uranium Mill Nears Completion

The new $3,000,000 uranium processing mill to be operated by the Navajo Uranium Division of Kerr-McGee Oil Industries, Inc. is scheduled to go into production before the end of the year near Shiprock, New Mexico. The photograph above was made when the plant was in a partial stage of construction. In the right foreground, a truck may be seen dumping ore into the AEC sampling plant which has been operated by American Smelting and Refining Company for several years. In the new mill behind this, ore flow will be from right to left with the material going through the following stages: fine ore storage; grinding; leaching; filtering; precipitation. Located on leased Navajo Tribal land, the mill will process uranium ores from Kerr-McGee's mining operations near Cove, Arizona, and will also buy and process ores from other mines in the area. The Navajo Uranium Division will operate the plant under contract with the U.S. Atomic Energy Commission.

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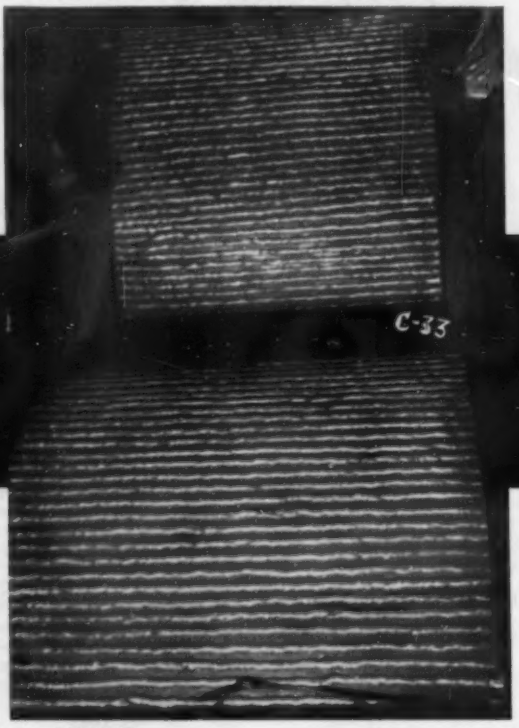

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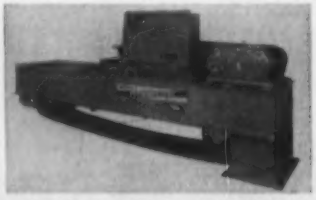

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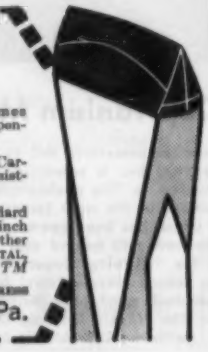

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sary operational and management techniques, but control of the properties will remain in the hands of the original owners.

ARIZONA

Kennecott Copper Corporation has been granted an extension on its option to purchase the property of *Bagdad Copper Corporation* at Bagdad, Arizona. Kennecott's exploration division, headed by Dr. James Boyd, has had several field geologists at the property during recent weeks conducting geologic studies and mine examinations. Purchase price of the option has not been revealed.

The *Sierra Ancha Mining Company's Red Bluff* mine north of Globe, Arizona is reported to be producing 150 tons of ore weekly which is shipped to the *Anaconda Copper Mining Company's* Bluewater, New Mexico Purchase Depot. The ore is said to occur in the Dripping Springs quartzite as shale-like fillings in cross fractures and bedding planes.

Extensive sampling and exploratory work with a churn drill is planned for the *Holy Cross* mine in the Cottonwood mining district, 30 miles southeast of Florence, Arizona. Present workings consist of a 100-foot incline shaft, 50 feet of drifts, and some crosscutting. K. B. Kennedy of Baltimore, Maryland is the owner of the property.

The *Cyprus Mines Corporation* has secured a purchase option on the property of the *Pima Mining Company* in the Mineral Hill mining district south of Tucson, Arizona. An investigation of the property is under way.

The *White Mountain Mining and Milling Company* of Bishop, California, is reported to have taken over the property of *Morning Star Milling Company* near Oracle, Arizona. The firm will use a new process in a 100-ton mill to treat ore from underground operations. David McConnell and Dan O'Flaherty will manage mill operations, and Tom D. Collis will be in charge of mining.

The *Copper Cities Mining Company* is now in production at its property north of Miami, Arizona. The first four sections of the concentrator are in operation producing copper concentrate, and the remaining three will be in operation by the end of the year. *Miami Copper Company* is the parent organization.

CALIFORNIA

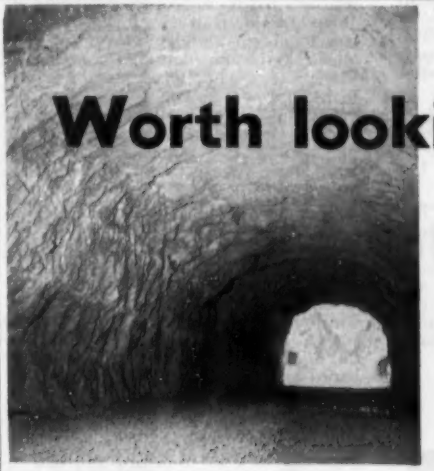
Nev-Tah Oil and Mining Company reports that it has struck high-grade tungsten at the 100-foot level on its property in the Mount Tom district 20 miles west of Bishop, California. Initial shipments will be made soon to the *United States Vanadium Company* mill at Bishop. The firm has also recently acquired 23 uranium claims in the *Yellow Buck* and *Buck Horn* groups in the Gas Hill area of Fremont County, Wyoming.

A $50,000 mill expansion program is being conducted at the property of *California Quicksilver Mines, Inc.* at Williams, California. Mill capacity will be increased from 40 tons a day to 80 tons. Company officials said the expansion program was motivated by the finding of an ore body, and the government guarantee of the price of mercury at $225 a flask.

Mt. Shasta Steel & Tube Company, formed by G. I. Dumond, is now core drilling on the *Shasta Lake* iron ore deposits near Redding, California. The *Morrison-Knudsen Company, Inc.* is assisting in the drilling program, and Bert C. Austin, president of *Idaho-Maryland Mines, Inc.*, is consulting engineer. These deposits have been known for many years, and were worked for a short time after World War I. The ore is low grade and situated in particularly rugged country which has hampered any past development.

The *American Potash and Chemical Corporation* has completed a new $150,000 control laboratory at its main plant in Trona, California. The lab will constantly test chemical solutions before, during and after their processing at the production plant.

Harry L. Moore of *Roads End Mines* at Big Bar, California, reports that a dike carrying tungsten mineralization has been found in the Price Creek area near Big Bar, Trinity County. The tungsten minerals have been identified as scheelite, wolframite, and cupro-scheelite.



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Exploration is still going on. A new road has been constructed and power lines are being installed. The firm hopes to go into production soon, with mining by open-pit methods.

American Sulphur and Refining Company of Beverly Hills, California, has acquired from the *Standard Oil Development Company* exclusive license to a process for extraction of sulphur from ore by means of solvents. The firm believes it is a cheaper recovery method and may make possible the development of heretofore unprofitable deposits. A refining plant is being built in Utah which will use the process.

Quite a bit of gold mining activity is under way in the Downieville and Alleghany areas of Sierra County, California. At the old *Kirkpatrick* mine a tunnel is being driven and timbered by a small crew. The mine is owned by Charles G. Johnson, California state treasurer. The Brainards' *Liberty* mine on Kanaka Creek has been leased to a Mr. Hamberg who has three men working there. Henry B. Tiedemann of Alameda is reported to be reopening the *City of Six, Golden Bear Quartz,* and *Gum Boot Placer* group of mines. Donald Read is in charge of the work.

Gladding, McBean & Company has awarded a contract to *Payne Construction Company* of Oakland, California, for construction of a $750,000 clay beneficiation plant at Ione, California. According to F. B. Ortman, president, the plant will be operated in conjunction with the sand separation plant of *Owens-Illinois Glass Company.*

Options on the old *Buckingham* and *Little Giant* silver, gold, and lead mines near Battle Mountain, Nevada have been taken by H. D. Ramsey and associates of Cottage Grove, Oregon. The Buckingham shaft is now being reconditioned and further exploration will be undertaken to determine the extent and value of existing ore bodies as well as any unknown ones. The Buckingham was acquired from Mrs. Margaret O'Leary of Reno and the Little Giant, which adjoins, from Mrs. Gertrude Burridge of Battle Mountain.

The *Westvaco Division* of *Food Machinery and Chemical Corporation* has given up its negotiations with claimholders in the Dacie Creek uranium field of Nevada. Many of the claimholders in the area had agreed to pool their claims and had granted Westvaco exclusive rights to explore until January 1, 1955, with "first refusal" rights thereafter extending to June 1, 1955. However, it was too difficult to obtain complete agreement from all of the claimholders in the area. The Dacie Creek uranium occurrence is said to be in a new formation, and could develop into a large medium- to low-grade deposit. It was believed that it could best be developed as a centralized operation. Dacie Creek is near Battle Mountain.

The *Mound Springs* mine operated by *Barium Products, Ltd.* 20 miles south of Battle Mountain, Nevada has been awarded two safety plaques for an accident-free record in 1953 by the parent firm, *Food Machinery Corporation* of San Jose, California. Present production from the open pit is about 600 tons of crude barite mined and shipped each week to the firm's plant at Modesto, California. James Jurey is superintendent of the Nevada operations.

For the six-month period ended June 30, 1954, *Getchell Mine, Inc.* mined 103,134 tons from its tungsten property at Red House, Nevada. Total ore milled during this period was 150,247 tons. 10,192 tons of which was purchased custom ore. Tonnage for the same period of 1953 was: company-owned ore mined 67,606; total ore milled, 117,296; custom ore purchased, 11,891.

A group of uranium claims near Yerington, Nevada is meriting some attention from Southern California mining interests who are negotiating for a 30-day option on the property. The claims, the *Little Red Head* group, were located by Cecil B. Hanson and his brother, Kenneth F. Hanson.

The *Mogul Mining Company* is reported to have sunk a shaft 50 feet and to be drifting in both directions at its leased property on the George S. Reed Ranch 40 miles north of Winnemucca, Nevada. One carload of manganese ore has already been shipped to the government's purchase depot at Wenden, Arizona and plans call for regular shipments of one carload per month. H. A. Modarelli and Peter E. Galli, Jr. formed the company.

Sam Willig of Turlock, California has taken a lease on mining property owned by Mrs. Cora Bishop at Rosebud, Nevada. It adjoins the Paul Webster gold property that was successfully worked for a number of years.

Pabco Products Company has acquired a gypsum deposit at Lovelock, Nevada from *Ideal Cement Company.*

Recently incorporated in Nevada is the *Vad-Ore Exploration Company.* Incorporators are Verne E. Ruedy of Oswego, Oregon; Thomas R. Ryock of Portland, Oregon; and Aram Barton of Portland, Oregon. They have taken claims on the Wilson Ranch near Denio and reportedly plan to develop, locate, and operate claims of fissionable materials. Another new firm in the state is *Thunder Mountain Mining Company, Inc.* organized by Don McGrew of Orleans, California. He is president and treasurer.

A 500-ton gypsum mill and plant will be established at Lovelock, Nevada, by a group consisting of Everett A. Roach, Floyd J. Day, and H. E. Peterson.

C. A. Anderson reports that he is sinking on the No. 2 vein on his *Ceader* claim near Bellehelen, Nevada. This vein was 18 inches wide on the surface and pinched to six inches at 20-foot depth. At 30 feet a high-grade seam formed the foot wall of an eight-foot quartz vein. At the latter level, the ore assayed 0.14 percent gold, and 19.67 silver; at 20 feet it assayed 3.64 gold and 319.65 silver.

The *Cucamunga Scheelite Corporation* is mining tungsten on property leased from Ira Miller and Eddie Shaw in the Cucamunga district west of Goldfield, Nevada. Officers of the new firm are James Crocker, president; Jerrell S. Wisdom is vice president; and Helen Wisdom, secretary-treasurer. A mill has been purchased and it will be converted to flotation as soon as possible. The firm has also purchased the *Old Blue Star* and the *Old Mojave Mud* camps.

Al St. Clair is preparing to mine a quicksilver vein on his property in the Antelope Springs district near Lovelock, Nevada. He has erected a building and will install a compressor there soon. His property adjoins the *Red Bird* mine formerly operated by Harold's Club of Reno.

(*Continued on page* 101)

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U.S.A. Metal & Mineral Prices

METALS

October 18, 1954

COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	30.00¢
	Lake. Delivered, destinations, U.S.A.	30.00¢
	Foreign Copper. Valley basis	30.00¢
LEAD:	**Common Grade.** New York	15.00¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton, Eagle-Picher	$187.50
ZINC:	**Prime Western;** F.o.b. E. St. Louis	11.50¢
	Prime Western; Delivered, New York	12.00¢
	Tri-State Concentrate, 60% zinc, per ton	$68.00
ALUMINUM:	**Primary 30 Pound Ingots (99% plus).** F.o.b. shipping points	22.20¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	29.00¢
BISMUTH:	(in ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$1.70
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.60
COLUMBIUM:	**Powder** Nom., per pound	$75.00
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.75¢
MERCURY:	**Flasks.** Small lots, New York	$328.00-$330.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery,, Port Colbou ne Ontario	60.00¢
TIN:	**Grade A. Brands.** New York (Price per pound) Prompt delivery	93.50¢
TITANIUM:	**99.3%** + (Price per pound)	$4.72
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:	**Per Ounce**	$84.00-$87.00
ZIRCONIUM:	**Sponge, Per Pound**	$10.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO.** F.o.b. mine, Colorado $47.00 per unit Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight. **African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio** $44.00-$46.00 **African (Transvaal). 48% Cr_2O_3. No Ratio** $31.00-$32.00 **Turkish.** 48% Cr_2O_3. 3 to 1 chrome-iron ratio $50.00 U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore. Includes 100% bonus.
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports **Mesabi, Non Bessemer, 51.5% Fe.** Second quarter $9.90 **Mesabi, Bessemer, 51.5% Fe.** Second quarter $10.05 **Old Range Non Bessemer.** Second quarter **$10.15** **Old Range Bessemer.** Second quarter $10.30 **Swedish,** Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit 22.00¢
MANGANESE ORE:	**Metallurgical grade.** 48 to 50% Mn. Long ton unit $1.05 **Metallurgical grade.** 46 to 48% Mn. Long ton unit $0.95 **Metallurgical grade.** 45 to 46% Mn. Long ton unit $0.85 **Chemical grade.** 80% MnO_2. Per ton $70.00 **Domestic** U. S. Government are purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treating costs. Wenden, Arizona; base price of **$8.54** per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg Montana base price of $6.43 per long ton unit of 15% manganese ore Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.
MOLYBDENUM CONCENTRATE:	90% MoS_2 F.o.b Climax, Colorado. Per pound of contained molybdenum, plus cost of containers $1.00
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit $63.00-$65.00 **Foreign.** 65% WO_3 Per short ton unit (Scheelite) $26.00-$27.00 **Foreign.** South American, Spanish, Portuguese $23.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, Moab, Hite, and Monticello, Utah. Shiprock, and Bluewater, New Mexico, Edgemont, S. Dakota. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello, Shiprock, and Bluewater Per Pound V_2O_5 $0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b. Wyoming points. Per ton in carload lots $12.50 **Oil Well grade.** Packed in 100 pound paper bags $14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois- Kentucky mines $42.50 **Mexican.** 70% f.o.b. border $25.00 **European,** Atlantic Ports, 70% $37.00 **Acid Grade.** 97% CaF_2 F.o.b. Kentucky, Illinois, Colorado $60.00
PERLITE:	**Crude:** F.o.b. mine per short ton $3.00 to $5.00 **Plaster grades.** Crushed and sized. F.o.b. plants $7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas $25.50 **Export** $30.50

LONDON METAL AND MINERAL PRICES

October 15, 1954

		Per Long Ton		USA Equivalent cents per pound[1]
COPPER:	**Electrolytic, spot**	£272	10d Os	34.06¢
LEAD:	**Refined, 99.9%**	£110	10d Os	13.81¢
ZINC:	**Virgin, 98%**	£ 83	15d Os	10.47¢
ALUMINUM:	**Ingot, 99.5%**	£156	0d Os	19.50¢
ANTIMONY:	**Regulus, 99.6%**	£222	0d10s	27.81¢
TIN:	**Standard 99.75%**	£733	10d Os	91.69¢
TUNGSTEN:	**Long ton unit, 185s equivalent to**			$25.90

1. With Sterling pound at $2.80.

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(*Continued from pgae 98*)

NEW MEXICO

The *New Mexico Copper Corporation* has completed installation of its Diesel electric power unit at its combined mineral reduction plant at Carrizozo, New Mexico, and the mill should be in operation shortly. The firm reports that it has also done considerable technical research work on a rare earth deposit it has opened up on one of its properties. Two other deposits have been opened up by bull dozer stripping—one contains copper, lead, and fluorspar; the other fluorspar. The company also has a block of ore on the lower level in the *Conqueror* mine showing copper, lead, silver, and fluorspar.

What is considered to be the longest underground conveyor system in the United States is being installed in the potash mine of *Potash Company of America* at Carlsbad, New Mexico. *Hewitt-Robins, Inc.* is extending the present 5,800-foot-long conveyor an additional 32,320 feet which will increase combined length to 38,120 feet, or 7¼ miles. The longest conveyor currently in operation is 5⅝ miles and is in a Pennsylvania coal mine. The Potash Company's unit will operate 1,000 feet underground in a potash seam about four feet thick. Continuous mining machines will extract the ore from the working face and deposit it on a shuttle-type conveyor which automatically transfers it by intermediate belts to the main line. From there the ore is carried more than five miles to a 3,000-ton underground storage pocket. The system is to be completed late in 1955.

The *United States Geological Survey* has reprinted its map of the southern part of San Juan Basin, New Mexico, first published in 1933. The map shows the geologic structure of an area of more than 4,000 square miles, covering parts of McKinley, San Juan, Sandoval, Bernalillo, and Valencia counties.

OBITUARIES

Patrick A. McCarran, 78, United States Senator from the state of Nevada and long-time supporter of the domestic mining industry, died of a heart attack September 28 in Hawthorne, Nevada. Active in national politics for more than a quarter of a century, Senator McCarran was noted as a champion of the West, especially the silver mining industry, and was a leader in promoting legislation to encourage the industry.

Oscar Weill, manager of the Union Manganese Company in Marion, Virginia, died late in September as a result of injuries incurred during a mine cave-in. He was a widely known authority on manganese occurrence and production both in Virginia and in the eastern United States.

John McBride, sound money advocate, Congressional Committee clerk, and author of many reports and articles, died September 20 in Portland, Oregon, at the age of 70.

William W. Sloane, vice president in charge of engineering for the Goodman Manufacturing Company, died September 8. He had been with the Chicago, Illinois firm since 1911 and became vice president in 1945.

Fred S. McNicholas, 66, authority on open stope and blockcaving mining methods, died late in September in Denver, Colorado. He was a mine superintendent for Granby Consolidated Mining, Smelting and Power Company in British Columbia for several years, and from 1926 to 1951 was assistant general superintendent and consulting engineer for the Climax Molybdenum Company, Climax, Colorado.

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2—6" x 48" Hardinge Conical Ball Mills
1—8' x 22" Hardinge Conical Pebble Mill
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1—121 CFM Gardner-Denver, 8" x 6"
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1—179 CFM Ingersoll-Rand, 12" x 10"
1—213 CFM Blaisdell, 14" & 9" x 8"
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1—8" x 36" Universal Jaw Crusher
1—11" x 18" Universal Jaw Crusher
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1—10" x 16" Hercules Jaw Crusher
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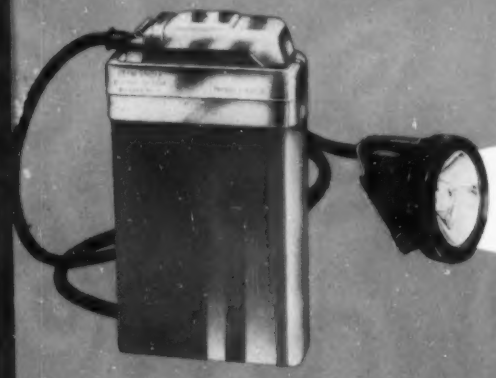

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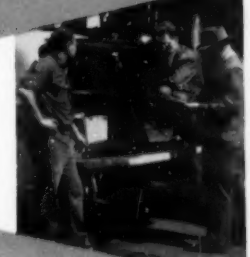

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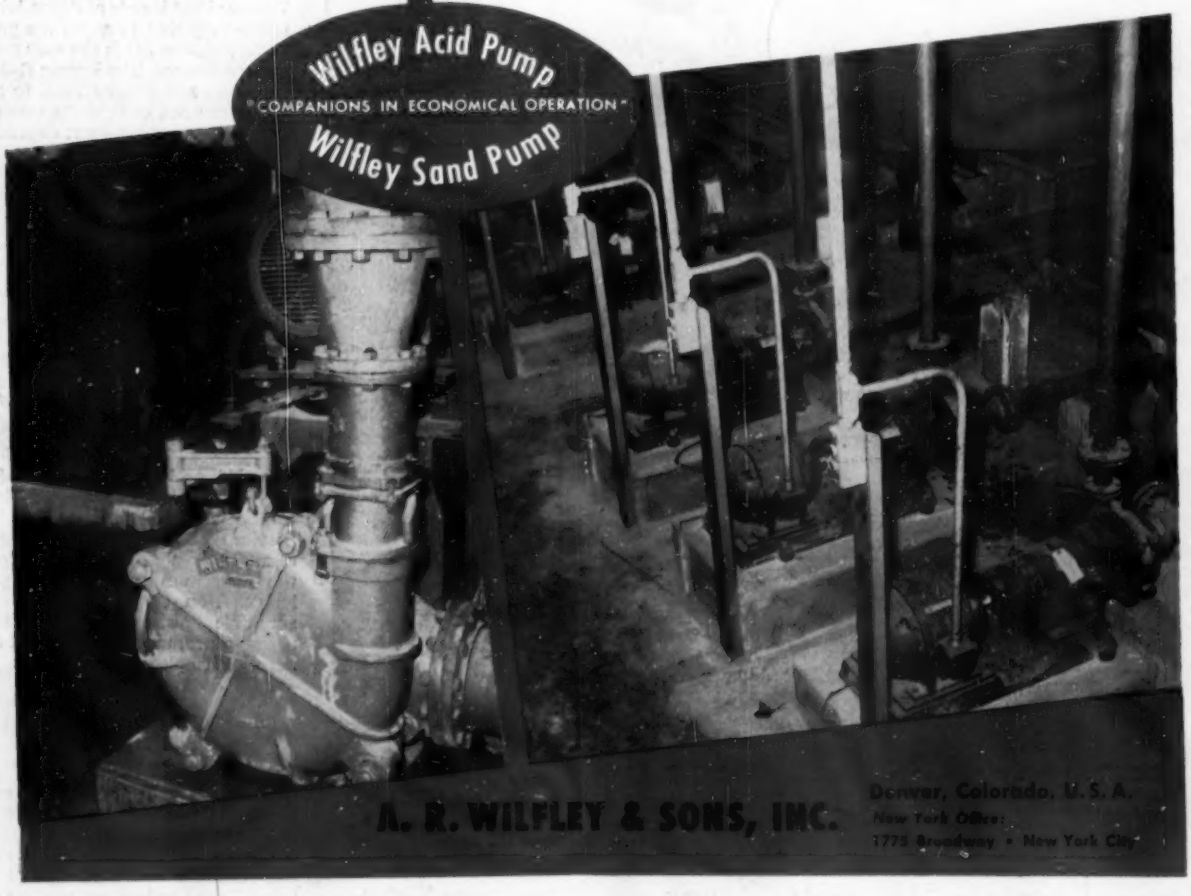
Shown here are typical Wilfley installations. Rubber lining, alloy irons, plastics and stainless steel are some of the materials used in Wilfley Sand Pumps and Acid Pumps to provide maximum pumping efficiency.



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